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A MCGRAW-HILL PUBLICATION

JUNE 6, 1955

50 CENTS



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I am pleased to note that the National Aeronautics Association, Inc. (NAA) has selected Aviation Week as its official publication for the year 1955. This is a great honor and a reflection of the high regard in which the NAA holds this publication. Aviation Week has been a member of the NAA since 1948 and has been a contributing member since 1950. The NAA is a non-profit organization which is dedicated to the advancement of aviation and the promotion of aviation education. It is a pleasure to be associated with such a distinguished organization. I am sure that the NAA will continue to support Aviation Week in its efforts to provide the aviation community with the latest news and information. I am also pleased to note that the NAA has selected Aviation Week as its official publication for the year 1955. This is a great honor and a reflection of the high regard in which the NAA holds this publication. Aviation Week has been a member of the NAA since 1948 and has been a contributing member since 1950. The NAA is a non-profit organization which is dedicated to the advancement of aviation and the promotion of aviation education. It is a pleasure to be associated with such a distinguished organization. I am sure that the NAA will continue to support Aviation Week in its efforts to provide the aviation community with the latest news and information.

Phillips 66  
PRESENTS

## MILESTONES IN AVIATION

## Full Steam Ahead

That the catapult method of launching aircraft from a ship could be practical was demonstrated on November 12, 1912, in the Navy Yard at Washington, D. C., when a blase of compressed air propelled a plane, carried on a cradle, along a track laid on a barge, and into the air.

In November of 1915, a Curtiss Flier took off on the first successful catapult launching from a battleship deck. In 1916, the catapult launching device was made standard equipment of the Atlantic Fleet. Since then, catapult-launched aircraft have proved themselves available to our Navy.

Aviating power has moved from compressed air through steam and hydraulic pressure to today's high speed of jet aircraft, the catapults became the standard method of launching planes from decks of aircraft carriers. Today, steam from the ship's boilers provides the power for speedy launching of aircraft from all U. S. Navy carriers.



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**NEWS DIGEST**

**Domestic**

Douglas Aircraft Co. delivered Embraer Air Lines' first DC-7B last week, following acceptance of two previous versions for the American World Airways and type certification by Civil Aeronautics Administration. EAL will put the 418 mph transport into New York-Miami service July 15. It will also deliver on the second and third month June 15 and June 20. FAA flew two DC-7Bs to Miami for engine modifications and will start North Atlantic flights June 15. Both versions are powered by Wright Turbo Compound B119A-DMM engines. The seven water radials, equipped with saddle tanks, has a cruising range of 5,120 miles. Douglas reported the DC-7B's guaranteed gross weight was increased to 115,000 lb from 125,000 lb, tailoff length cut to 6,100 ft from 6,500, and landing length reduced to 5,500 ft from 5,900 ft.

Manquard Aircraft Co. issued down interest offers by Douglas Aircraft Corp. to merge the Chrysler Aero into UAC's operations. "... The best interests of the corporation for growth and development in its areas of interest for defense production lie in continuing Manquard's activities as an independent entity," the company's management said, "... and negotiations looking toward a merger with United Aircraft Corp. should not be pursued."

Federal Aviation Corp. received a \$13,900 contract from Douglas Aircraft Co. to produce jettable fuel tanks for the A4D, F4D, F1D, and AD-5 and AD-6. The 300-gal. 16-lb. long tanks were designed by Douglas.

Air Carrier Service Corp. signed a contract with Capital Airlines to sell CAP's DC-4 fleet to delivery Vickers Viscounts are delivered.

Texas World Airlines inaugurated weekly first-class flights between New York and San Francisco June 1 with Lockheed 149HC Super Constellation.

Teneco Aircraft Corp. was a subcontractor from North American Aviation to produce F-100D wingtip pods, inboard and outboard ailerons and flaps. Total value of the award says that \$1 million.

United Air Lines converted nine flat-bed Douglas DC-6s to 72 passenger aircraft configurations.

Dumont Airlines Associates purchased



**Lockheed Tests Two C-130s**

Two prototypes of Lockheed Aircraft Corp.'s turbo-prop C-130 Hercules jet into the air together for the first time. First prototype (right) is being tested at a gross weight of 14 tons. Second (left) is undergoing shakedown and power checks. Production USAF transports are taking form at Lockheed-Georgia.

closed Industrial Associates, Inc., and is moving the firm's entire management and physical assets from Los Angeles International Airport to Long Beach, where it will operate in a division of Diamond.

**Financial**

Rohr Aircraft Corp., Chula Vista, Calif., earned a \$2,351,800 net profit during the nine months ended Apr. 30, compared with \$2,645,000 for the same period last year. Sales dropped to \$61-512,000 from \$77,496,000. Current backlog, more than \$12 million.

North Central Airlines had a net profit of \$19,032 for the first four months of 1957, compared with a \$28,613 loss during the comparable period last year.

Century Engineers, Inc., Burbank, Calif., reported a backlog of \$6 million.

General Vought Aircraft, Inc., Dallas, declared a 40-cent dividend, payable June 25 to stockholders of record June 10.

**International**

Russian Air Force is taking steps to produce attaching tractors for its jet loaders, according to Kromsky Zvezda, daily newspaper of the Soviet Ministry of Defense. An article written by Engineer-Major T. Ryzhikov and the

order will be "equivalent in type to jet loaders."

First F-4E Sabre to be supplied by NATO to Italy's Fiat made its initial test flight at Torino. The aircraft was put together from parts shipped to Fiat by North American Aviation. Similar to the F-4D, NATO's all-weather interceptor is armed with four 20-mm cannons instead of rockets and carries a North American designed AG-4 fire control system.

Queen Charlotte Airlines turned down an offer by Pacific Western Airlines, its rival in Canada's British Columbia, to buy QCA for an estimated \$300,000.

Royal Australian Navy plans to equip two fleet squadrons with torpedopropelled Fawcett Gammas and use with de Havilland jet Sea Venoms. The new aircraft will be delivered to Australia in May 1956.

Air Vice Marshal Sir Francis Melick, 50, retired World War II commander of RAF's Strategic Air Force, Eastern Air Command, was killed in a helicopter accident May 13 at Chichester, Sussex, England.

Trans-Canada Air Lines Lockheed Super Constellation flew from London to Montreal in 18 hr. 55 min., setting a new TCA record for the 3,575-mile route. Average speed: 535 mph.





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## Washington Roundup

### Aircraft Investigations

Investigation of aircraft defense contracts now under way on Capitol Hill won't leak into the public limelight for several months, some not until next year when the president will be at stake.

**Senate Banking and Currency Committee**, headed by Sen. William Fulbright, is drawing up its own list of companies with the largest volume of defense business. Staff members on the Defense Department's list (AW May 20, p. 15) completely missed the point.

The committee is interested in the effect of defense business under the military buildup—which started in mid-1950—on the stock market and the economy in general.

Defense Department's report to the committee lists the volume of contracts let between mid-1973 and the end of 1974. It shows firms such as General Motors Corp. and Chrysler Corp. with "minor" volumes of defense business.

Gas and nuclear companies "It took Defense Department 10 weeks to draw up their list for us. We decided to do the next one with the long-agoed not-so-secure ourselves." The prospect: On the committee's list, firms such as General Motors—shouldn't even appear in the department's list—will show up as the top companies on volume of defense contracts.

Robert Laybourn, Deputy Assistant Secretary of Defense for Logistics and Supply, said "This report was made for the 18 months... at the specific request of the Senate committee. They asked for that particular period of time."

**House Armed Services Subcommittee**, headed by Rep. Edward Rosten, was open hearings by August. The subcommittee is investigating all conceivable aspects of an aircraft contract—like Air Force and two Navy.

**House Appropriations Armed Services Subcommittee**, headed by Rep. George Mahon, is just starting its assembly on investigation staff (AW May 21, p. 17). "We are not out to find individual cases of graft—although I expect there is some of that," Mahon told *Airways Weekly*. "We want a very thorough investigation to find out who contracts are getting so let in defense business. This will take a long time and many field investigations at the staff level."

The project: The subcommittee may see information it collects so late in defense officials when they appear before it early next year on the budget for fiscal 1977.

**Senate Preparedness Subcommittee**, appointed over two months ago with Majority Leader Sen. J. William Fulbright as chairman, hasn't held an organizational meeting or selected a counsel and staff.

### Field Representative Controls

**Armed Services Arms** is seriously disturbed by Air Force efforts to tighten controls over field arm representatives. USAP, which has the major share of about 2,500 company representatives at military installations, wants to put them under separate control, divorced from the production environment with their employees.

Object: To keep better control of the representatives and what they do, make it possible to cut down on their

numbers, charge their cost to proper USAF activity and provide the answer when companies ask how much is spent for this purpose. In addition, USAF charges field representatives sometimes emphasize companies, those they privilege, report military activities or are involved with apparent problems on the other hand, beneath such the representative should be present when USAF asks for help. This is to provide better service for customers, provide prompt communication with plant when facts or design change ideas are brought to light.

### CAB to Speed Cases

**Civil Aeronautics Board Chairman Ross Bailey** has set this schedule for processing major cases:

**New York-Chicago Case**, with 21 participants: Civil lawsuit will start in August or September.

**Detroit Case**, with 9 participants: The Board's decision will be issued in the fall, after oral arguments during September.

**Bridge Case**, with 212 participants: The Board hopes to dispose of this before the first of the year.

### Prototype Testing

Legislation extending Civil Aeronautics Administration's 512.3 rule authorizing to test prototypes at non-transport types seems to have little chance of reference. The subcommittee has been on the books for five years. But after several failures, CAA stopped attempting to obtain funds from Congress to implement the program.

CAA and the industry, though, would like to keep the subcommittee on the books—so the climate might change.

The legislation proposed by Sen. Warren Magnuson would extend it another five years, from the expiration date Sept. 30.

### ODM's Dispersal View

**Defense Mobilization Director Arthur Flemming** attempted to put industrial dispersal, where a hot political issue, in perspective at a Congressional hearing. He observed "We regard this as an age of peril." The President has declared that to be 40 to 50 years and we think this industrial dispersal objective is one that should be set within that framework and not regarded as an objective to be achieved overnight. In fact, it cannot be achieved overnight.

"I feel that we have isolated the place where we have to do this on a one-by-one basis and that we cannot apply nationwide standards... dispersal is a headline objective but we cannot let it become an end in itself, because another objective we must always keep in mind is a properly functioning urban economy. If we went wild on dispersal we could destroy our urban economy, and instead of strengthening our strategic position weaken it."

Meanwhile, ODM is working on four methods plan to erect autonomous that might develop. Involvement in local facilities; general mobilization not involving an attack on the U. S.; general mobilization with an attack on the U. S.; and prompt mobilization, at the peak of a battle, necessitated by an attack on the U. S.

—Washington staff

## USAF Recognizes Red Gains, Spurs B-52

Boeing bomber production schedule is accelerated, reversing Administration position on Soviet air power.

By Claude White

Washington, D.C.—U. S. Air Force has accelerated production of the Boeing B-52 bomber, reversing the Defense Department's policy of discounting the threat of growing Russian air power. At the Pentagon last week, another action was being considered for fighter aircraft in the "Century Series" now in production. These include the North American F-100, McDonnell F-101, Convair F-102 and Lockheed F-104.

Decision to speed production output of USAF's largest and fastest jet bomber followed congressional pressure led by Sen. Stuart Symington, a former defense secretary, and discussion in Assembly Ways (May 25, p. 12) of the facts about recent Soviet display of new planes over Moscow.

Scheduled rate of increase in production of the B-52 is 15%. Expected cost is \$300,000,000.

News of the increased production rate of the Boeing bomber came only 45 days after a press conference in which Defense Secretary Charles E. Wilson confirmed figures on the recent Moscow air display in published in *Aviation Week* but maintained that the U. S. response is held separately, and said he did not expect to ask Congress for more USAF appropriations.

### President's Views

Obvious Pentagon hope was that a full scale reorganization of U. S. analysis for atomic war and New Top Defense Department involve analysis and use intelligence information would be needed.

The conference last week was that the Administration was deeply deflated by the progress made in Russia but was attempting to avert any more date investigation by ordering big jet bomber build faster from the original schedule.

While Sen. Symington and other Democrats favored an investigation, a positive decision had not been reached.

Sen. Leverett Saltonstall and other Republicans denigrated the need for more, insisting that the U. S. has a long qualitative superiority and has a big advantage in the location of its

strategic base. Sen. Saltonstall refused to comment on the decision to speed B-52 production.

President Eisenhower last week and Moscow had exhibited more modern jet bombers than the U. S. had anticipated. But, he insisted, the American B-52 is still a good plane. He made no mention of the disclosure that the Russians now are known to have thousands of the new MIG-17, an aircraft comparable to the North American F-101 and an efficient successor against bombers of the B-56 type.

It was USAF Secretary Harold E. Talbott who announced that production of the Boeing B-52 Superfortress will be accelerated 15%, cutting one year off the timetable for completion of scheduled deliveries. The decision was announced almost immediately after Talbott and Gen. Nathan F. Twining, Air Force Chief of Staff, were questioned in executive session by the Senate Armed Services Committee.

### Wilson's Views

Only two days before, Defense Secretary Charles E. Wilson, belittled at his press conference by Roger Lewis, USAF Assistant Secretary for Material, showed no signs of being disturbed by the reports of Russian progress gains. They asserted the U. S. is returning its qualitative and quantitative air superiority.

Wilson and Lewis indicated that there was some fear of concern because the B-52 is being built at both Seattle and Wichita plants of the Boeing Airplane Co., and production could be increased at any time.

Sen. Wilson: "We can step up our production on specific items at any time if it is determined necessary to meet our threat to our country."

He did not describe the Moscow air display as a threat and indicated there would be no alteration of production schedules.

### Congressional Reaction

Reaction of Senate critics to the report that 105 hours later was expressed by Democratic Sen. Hubert H. Humphrey, who commended the Air Force for its action, but added:

"I only wish the Secretary of Defense

### Effect on Boeing

Boeing spokesmen told *Aviation Week* they do not expect increased production of the B-52 will cause any appreciable losses in employment rate.

They pointed out that the learning curve at the Seattle plant is declining. It was expected that there would be some reduction in employment, caused by several factors. Under the new program the figure will be some, the new plant, where the B-52 line is set up, but no aircraft have been completed, the unit holds true because the company is gradually phasing out the B-47 jet bomber.

Additional facilities needed at the two Boeing plants will be some, the new plant will, mostly in the area of machine tools.

The staff representative had already indicated for the B-52 project, involving several major units and component manufacturers, is expected to accelerate the program. Being sold some additional sources may be needed.

had been more frank and factual in his attempts to inform the American people on the subject of air power.

The information on which the Air Force decision is based now available to Mr. Wilson at the time of his press conference, although as it had already been made available to our Atomic Energy Subcommittee through the transmission of our top military leaders.

Sen. Jackson continued:

"The airplane truth is that for the next few years the ability of the U. S. to stay ahead in the materials race will depend on the extent to which we push development of our delivery systems. These involve not only long range jet bombers but jet fighters also as well, together with our whole family of guided missiles including the most sophisticated—all the subsonic and supersonic missile."

"The way for the last weapon is the most vital since the race for the hydrogen bomb and only a crash effort is this field by our government can avoid disaster."

In the past we have had a large lead in industrial technology as the Soviets. We can no longer rely completely on our superior technology and industrial knowledge. Today we find that the Russians are striving to duplicate a sufficient part of their

industrial potential to a given amount of time, they must be treated as equals. "We simply can't afford to take second place in any of the races to develop the most effective delivery system for nuclear weapons," Sen. Jackson said.

### Senator 'Not Satisfied'

Democratic Sen. Warren G. Magnuson, citing only in attack and development funds in the weapons race gets better, and "there would be more cost but in knowing that we have in the drawing boards and ready for production new, faster and better models."

Magnuson, a member of the Senate Appropriations Committee, charged the civilian leaders in the defense establishment and the Administration have not recognized and still do not recognize the basic cause of our weakness.

There would be more support in an announcement from the Administration of an accelerated program for research and development and for training scientists and engineers, who are indispensable to it.

Another member of the Senate Armed Services Committee, Democratic Sen. Sam Ervin, and he was not satisfied with the announced 15% increase in production rate for the B-52.

"I think it should be stepped up more," he said. "We need more money being in diagram times and act accordingly."

Democratic Rep. Cline Engle told the House that General Twining himself did not understand the Russian threat and pointed out that the USAF chief had bluntly told Soviet long range jet bomber "given us and must be a concern."

Engle congratulated Twining for understanding the implications of Russian progress, saying they "have upset the timetable again and have delayed on strength faster than we expected them to." With defense strength advanced, they are now building an efficient long range bomber force to deliver the atomic weapons that they also achieved ahead of the schedule we had set for them."

### Effect of Decision

Anticipated effect on the accelerated B-52 production schedule had several factors.

- **Unofficial estimate** was that USAF would ask Congress to order for \$100 million in additional funds for the added costs of the program. This was for the bomber alone, did not include reserves for possible increase of planes.
- **There were reports** that a total of 900 B-52's is involved in the Boeing order, including that the size of USAF heavy bomber wings will be increased in the



CHANCE VOUCHER 170.3 OUTLINE shows how a design tested by a North American A-1J order during a Navy demonstration of its small sailing concept for carrier-based intercept attack (AW May 14, p. 85). Both are from Air Development Squadron 3.

Conair B-56 is replaced by the new heavy jets. At present a heavy bomber wing has 30 aircraft. This probably will be increased to 45. USAF has 10 heavy bomber wings.

USAF, already has a reduction in standing funds, have sent new personnel problems to absorb aircraft faster than the original schedule. Transition from air and ground crews and operations facilities programs will be required by the change. It is anticipated that the Fiscal 1957 USAF budget request will reflect the need for money to meet these contingencies.

• **While airline thought** is being given to the necessity for improved operational facilities, there was no reduction that anyone outside of USAF is de-

ing attention to the subject. Secretary Wilson and the U. S. will depend on superior technology rather than matching the Russians in number of planes. A next issue, President Eisenhower said is did not know that the Air Force will ask for more money for operational losses, but he hoped that the Russian long range bomber units will spur Americans to do more for the end defense program.

• **Paul E. Warner Division**, United Aircraft Corp., was prepared to supply deliveries of the J57 engine. Eight of the 10,000 of these engines are used to power the B-52.

• **Mr. Bureau of Aeronautics** said that no action on the production rate of carrier aircraft is contemplated.

# CAB Speeds Local Certifications

By Preble Storer

Washington, D.C.—Civil Aeronautics Board last week outlined simple procedures to carry out legislation governing permanent certificates to local service airlines.

The Board and five 14 eligible airlines have been to agreement that the process of issuing certificates should be handled in the quietest, easiest and least expensive way.

Chairman Ross Bailey told the carriers that the Board and its staff "stands ready to expeditiously the new law in so far as possible after they fill applications in accordance with the new act."

## Privileges Arranged

Each permanent certificate provides various three steps:

- The local service air carrier must file an application.
- The Board will issue a show cause order.
- Public hearings will be held in Washington.

To further expedite the proceedings the Board has been authorized, pending over other local service cases issued, and a schedule for applications established.

The Board's certification policy statement said: "These proceedings will be limited to the instant interest in the goal of permanent certification to the carrier and the determination of those intermediate points to be certified on a temporary basis."

The permanent certificate proceedings will be scheduled for processing in the order in which the carriers complete temporary certificate orders (see box). This will be given priority over other local service cases.

Because of the construction of the new law, those eligible non-continuous airlines, and in order to ensure the most efficient use of available staff personnel to the extent and resources of these cases, public hearings will be held in Washington.

## Problem Before Board

Major problems confronting CAB were determining which noncontinuous points on a carrier's route will warrant permanent certification and which ones will be only temporary certificates.

The Board's solution is to set on an industry-wide traffic standard, which should assure equitable treatment among the entire industry.

CAB said it found, after an analysis of the latest available data, "that an average of five or more passengers, enplaned per day (approximately 300 per

month on an off peak station) should provide a permanent basis for initial selection of the group of intermediate stations for permanent certification. In the absence of further evidence, those stations enplaning fewer than five per day would receive temporary designations."

The board further states it is "not to restrict the right of any party to submit relevant evidentiary material, the board believes that the record in the proceedings involving those points identified for permanent certification could be limited, largely, if not entirely, to stipulated data. Additional evidence, therefore might be necessary only in those points tentatively identified for temporary certification."

## No Service Loss

In this respect, the Board also stressed that no station which is eligible for either permanent or temporary certification will lose service as a result of the proceedings. The dots will be left open for any city listed in a show-cause order as qualifying only for temporary certification to submit the question in support of a permanent authorization.

At the present time, the local service industry has been authorized to serve 313 intermediate points. The carriers are actually serving 363 of these intermediate points. Based on traffic data reported in 1954, there were approximately 174 local service intermediate points for which five or more passengers enplaned per day and 93 points with less than five.

## CAB Guidelines

Other problems, not covered by the policy statement, but anticipated by the Board's staff include:

- How to treat other non-being used under an exemption certificate.
- What to do about cities authorized for service but not being used.
- What to do about cities where break that service has been suspended as in or of local carrier service.

The Board's guide in the new certification law which provides:

• A carrier must have been furnishing local service under a temporary certificate from Jan. 1, 1955, to the date of its application which must be filed in the period from May 15 to Sept. 16, 1955.

• Eligible terminal and intermediate points are those between which the carrier has operated between May 15, 1955 and the date of the carrier's application.

• CAB may limit the duration of the certificate to no less than one-half of the intermediate points.

## Proceeding Priority

Here is the order of priority CAB announced Board will follow in handling local service airlines' applications for permanent certification. The certificate proceedings are to be scheduled for processing in the order in which the carrier's existing temporary certificates expire.

Carrier	Expiration Date
Trans-Texas Airways	3/31/56
Southwest Airlines	5/31/56
Continental Air Lines	5/31/56
Western Air Lines	5/31/56
West Coast Airlines	9/31/56
Frontier Airlines	3/31/57
North Central Airlines	3/31/57
Lake Central Airlines	3/31/57
Central Airlines	12/31/56
Allegheny Airlines	12/31/56
Southern Airways	12/31/56
Romania Air Lines	12/31/57
Piedmont Airlines	12/31/57
Midwest Airlines	9/31/56
Glenn Airlines	9/31/56

The Board explicitly emphasized that its plans for proceedings were designed to expedite to submit the question in support of a permanent authorization.

CAB noted that consideration of proposed route extensions and modifications of local service routes necessarily will be delayed in order to give priority to the permanent certificate applications. However, the Board indicated it will consider such proposals as soon as possible in appropriate individual or consolidated proceedings.

First two classes designated to be permanently certificated by the Board are Southwest Airways and Trans-Texas Airways. CAB said it isn't contemplating the other two classes until it is satisfied that the carrier's existing routes are their as local proceedings are now completed concerning the temporary or permanent status of their routes. The program is to total decisions in the two cases nonexclusive.

## Five Carriers First

The other 12 air carriers being granted permanent certificates are Allegheny Airlines, Romania Air Lines, Central Airlines, Frontier Airlines, Lake Central Airlines, Midwest Airlines, North Central Airlines, Glenn Airlines, Piedmont Airlines, Southern Airways, West Coast Airlines, and Continental Air Lines.

The group issued that in 1954 submitted 93% of the appropriate fixed (5700 million), auxiliary and non-profit lines between just 1400 (3440 million) and in military (5500 million) was spent at military, non-military (28 million) figure, the report says, \$121 million was "work that was susceptible to shift into the civilian economy."

# Military R & D Lagging, Hoover Charges

Speaking out at the peak of a national debate over the extent of Soviet technological advances, particularly in air power, the House Committee last week charged that U.S. military services lack doing and imagination in their approach to radically new weapons.

The recommendation to Congress 15 recommendations of the Task Force Subcommittee on Research and Development in the Department of Defense and said:

- Adoption of the recommendations and firmness of their work could mean a jump in R & D effectiveness 25%.
- Improvement by 15% may not be enough "to maintain our leadership in weapons."
- Additional funds are necessary for the Defense Department to pursue R & D "experimentation and development."

The committee emphasized that all but two of the 15 Task Force recommendations can be carried out through proper administrative action in the Defense Department.

## Probe for Air Force

It was clear from the study that the R & D activity and administration in the Air Force was better than that of the Army, Navy or Defense Department staff. The Task Force also lauded USAF on these points:

- Establishment of an Assistant Secretary for Research and Development with an appropriate (Theodore G. Gaudin) who would be the professional representative for the job.
- Development of the weapon system concept to cover proper integration of components.
- Division of the Air Research and Development Command. The group recommended a new adequate permanent headquarters to replace temporary facilities at Ballistics.

Increased industry in private industry to carry out weapon system projects to carry out weapon system projects.

## Favors Civil Contracts

The House Committee Task Force again with the Armed Services Committee that research and development and design operations for new weapons mostly can be done better by civilian agencies.

The group issued that in 1954 submitted 93% of the appropriate fixed (5700 million), auxiliary and non-profit lines between just 1400 (3440 million) and in military (5500 million) was spent at military, non-military (28 million) figure, the report says, \$121 million was "work that was susceptible to shift into the civilian economy."

grants from conception to production, even when part of the work must be done at USAF installations.

The Army and Navy, on the other hand, have been slow to have organizations "well suited to the needs of modern weapons development." The report itself branches develop new ideas in "competencies," such with very independent steps or borrow that have a voice in weapon programs.

Both services, the Task Force said, are aware of the deficiencies and have taken steps to improve the situation. Civil service the Army's contribution to combat over the R & D projects under the Deputy Chief of Staff for Plans and Research (AW 100 33, p. 14) and a program that will give the Office of Naval Research staff co-ordination, responsibility a major contribution "that is 'limited step' in the right direction."

## Military Rotation

In passing on the 15 recommendations of the Task Force, the committee urged adoption of the 13 that can be put in effect administratively in order to then add in new recommendations concerning rotation of military personnel and the status of civilian employment.

- That military R & D officers serve longer periods to become professionals.
- That those officers get the same professional and generation they would have in other military units.
- That the civil service explore quality in R & D be strengthened.
- That the military recruitment in R & D in the Defense Department and the three services, established by the Prop. Dept. be chosen for their competence in the field.

The committee report declared that the 12-3 has separated the largest integrated scientific and technical endeavor that any nation has ever attempted and that "our strategy and tactics can be improved to those of potential superiority only in the context that research and development provide superior design of weapons."

It pointed out that military R & D budget proposals for fiscal 1956, including improved facilities and the use of personnel employed in other agencies total more than \$2.5 billion. To 1940 the sum was \$28 million.

At the top level in the Defense Department, the Task Force is critical of the expansion of functions into R & D and Applied Research Engineering and the "unusual incentives for each job it called the 'unusual experiment' and said

one military secretary should administer both areas.

## Criticism Duplication

The group laments a critical of waste and duplication in the R & D programs of the three branches of the armed forces. Some have already been placed as the "self-sufficiency complex" of the Army, Navy and Air Force.

While the report recognized the need for duplication in some areas, it asked the Defense Department to use its check on the program to halt projects that are not warranted.

Many of the new weapons contributions made in World War II, the report pointed out, were from the Research and Development Board. Some, then, it said, indicate new approaches "that are being carried through without sufficient problems in civilian scientists and technologists" while the armed services "have not distinguished themselves."

The Defense Department was urged to set up a top light committee to "examine the needs and opportunities presented by new scientific knowledge for military new weapons systems."

On the rotation of weapon systems, the report called for expansion of

# Questions Adequacy

New committee for military scientific and political affairs of the Defense Department, who fear that U.S. technological superiority has not kept ahead of Russian advances, are to be known as the House Committee Report on Research and Development.

Now the Committee's Task Force:

"Serious consideration needs to be given to the adequacy of the present research and development effort. Planning is an interdisciplinary scientific endeavor, the working technology of these major needs, the need for greater effectiveness in sustained defense, the opportunities for major improvements in all military branches through application of the rapidly evolving solid state electronics technology, for example, require in providing the Department of Defense with an increasing volume of research and development opportunities and funds. It would be false and dangerous economy to hold the research and development appropriations at a level too low to permit a release of effort concentrated to other positions in areas of potential for new and improved weapons."



the Weapons Systems Division Group, shifted to a constant operation, possibly with a temporary expansion of this activity as needed, according to the study, because it is of so much importance to the Joint Chiefs of Staff.

#### Personnel Requirements

- Other highlights from the report:
  - The armed forces are now faced with the operational strategic and personnel of high professional capacity in finance, logistics and personnel that they are in R & D where such a policy would bring the points raised.
  - Present activity in basic and applied research in the armed forces is inadequate. In 1954 this type of work accounted for only 530 million of expenditures for knowledge "have to be present in new weapons systems."
  - Expenses in R & D facilities and personnel for operations by the armed forces has been at a low level of effectiveness that could be obtained from civilian agencies—military, universities and non-profit institutions.
  - Military personnel in the office level in R & D jobs was scarce, but the commission said not enough young of

them are being trained for the complex jobs ahead. Even with a shift of a portion of the work to outside agencies, about 10% of the appropriated R & D funds would be spent within the Defense Department and comparable resources would be needed to improve these prospects.

- High priority was given to both the National Advisory Committee for Aeronautics and the Atomic Energy Commission for their competence and contributions to defense. The Tennessee Valley Authority received credit for work in relation to certain gases.
  - Members of the Staff have reported on the Defense Department R & D effort areas. Morris A. Bell, president of Bell Telephone Laboratories, chairman, National Research Council; Robert M. Kanarb, Massachusetts Institute of Technology, and former secretary of defense at Los Alamos; C. G. S. South director of research at General Electric Co. and Gluck E. Williams president of Battelle Institute and AFOSI advisor.
  - Former President Hubert H. Hanes, chairman of the Commission on Organization of the Executive Branch of the Government, transmitted the report.
- This committee will continue to provide the study and opportunities for such as new weapons systems. The Assistant Secretary of Defense (R & D) will appropriately implement this committee's recommendations where action is indicated.
- No 3. That the Weapons Systems Evaluation Group be shifted to constant operation with activities as was previously organized. It then be requested to be re-organized for performing the studies required by the Joint Chiefs of Staff and Assistant Secretary of Defense (R & D).
  - The Assistant Secretary of Defense (R & D) be requested for the actual control in bringing Weapons Systems Evaluation Group to an adequate level of use and effectiveness.
  - No 4. That an administrative review and assessment of the operations and contributions of all centers and committees be made by the Department of Defense and each of the military departments.
  - No 5. That an Office of Assistant Secretary for Research and Development be established in each of the military departments. This office be directed in its functions to the research and development organizations and operations of the departments.
  - That the Department Secretary be trained in science and technology and represented in the operations and all

- members of research and development.
- That the office have a small staff trained in science and technology and experienced in the operation and administration of research and development.
- No 6. That the level of basic research in the Department of Defense be significantly increased above its present 520 million level of annual expenditures.
- No 7. That where choice is possible, operations of research and development should be performed at that place in the nation where they can be done most effectively and with the greatest efficiency.
- No 10. That the Secretary of the Army and the Chief of Staff give strong support to the research and development work and organization of the D. D. 1954. The staff be adequate in size and of highest possible professional competence in research and development. The staff be given positive and effective administrative support in its operations in making its responsibility for control, organization and coordination of the Army's R & D programs.
- No 11. That the Secretary of the Navy and impossible areas. Navy should give strong administrative support to the new functions of the Office of Naval Research in coordinating and integrating the development program of the Navy. A staff adequate in size and of highest research and development competence be provided, and programmatic recommendations of Office of Naval Research be implemented.
- No 12. That each of the military departments make a realistic estimate of their growing needs for technical advice. It would be, in the first three subcommittee reports, expand their programs to provide, in general, for an expanding number of offices trained in research and development.
- No 13. That the three military departments review policies and their responsibilities on major officers in research and development. Those officers having the most of rationing of research and development officers to technical management, and increase the time period of assignment in a position.
- No 14. That higher levels of compensation for civil service professional employees be established more nearly comparable with industry, and the number of higher level civil service positions be materially increased.
- No 15. That the Department of Defense make a close examination of the operations under "engineering" and take appropriate action to assure the preservation of the present highly effective organization of the development process through the Military Liaison Committee and the Armed Forces Special Weapons Project Organization.

## Firing Nike Guided Missile from Anti-Aircraft Launching Sites



PRE-FLIGHT SERVICE includes filling in-house system, then . . .



FULLING MISSILE before it is moved into the magazine



ABOVE: NIKE is moved from the magazine through rail to launcher side by elevator



ON FIRING LINE, Nike battery moves into position at Loudon, Va., site near Washington



RADAR SCANNER (above) checks incoming and Nike missile is loaded into the air by hoists during practice firing in practical field housing of mid-air intercept facilities cross at Red Canyon Camp, N. M.



## Range of 6,500 Miles Claimed For TWA 1649A Super Connies

Los Angeles-Lockheed Aircraft's Model 1649A Super Constellation will have the greatest range of any aircraft ever built, according to a company report.

Maximum top speed will exceed 480 mph, with maximum range about 150 miles. But as a result of elimination of numerous reducing steps, the plane's point-to-point speed at ranges beyond 1,000 mi. will be up to 70 mph faster than any other piston-powered plane, it is claimed.

Scheduled to start service in 1957 on Trans World Airlines, 24 of the 6,500 mi. range planes will be produced for Howard Hughes (AW Apr. 25, p. 117) for assignment to TWA. Total cost, including spares, will be about \$7.5 million. The 1649A is expected to help establish a new pattern of air routes and make possible nonstop service between widely separated world airports.

Key to the plane's performance will be a completely new wing and the improved Model R3370-2A2 Wright Turbo Compound engine with 3,400 hp, instead of the present 3250-hp. (AW) engines in the 1649C Super Constellation.

The wing, largest of any jetliner in service, will span 150 ft—27 ft more than on present Super Constellation. Total area will be 1,650 sq ft, an increase of about 700 sq ft. But wing will be one-sixth thicker. Design of the wing

### Air France Orders 1649As

Los Angeles—Air France ordered 12 Lockheed 1649A Super Constellations for delivery in late spring of 1957. The order, worth \$12 million, is the second Lockheed lot ordered by this transport.

In keeping with Air France policy to maintain the most advanced fleet of its craft, the company has purchased the Lockheed 1649A Super Constellation and Boeing 3-Liners, general transporters for Air France's North and Central America and Caribbean Division. "It will be the only available commercial aircraft capable of schedule nonstop transatlantic service both eastward and westward."

Also a fuel tankage installation as future modification.

Firing question also is solved. Engines are five feet farther out on the wing to reduce sound and vibration. Additional improvement is expected from the larger propellers turning at slower speed. The five-bladed prop will measure 16 ft 10 in. against 15 ft. 2 in. now.

The new transport, carrying 55-64 passengers in luxury style, will be one suitable to higher-density tourist seating.



### New Look of the Shongri-LA

USS Shongri (LST-1161) is the Navy's first attack carrier to embody all of the latest improvements being made in the Essex-class. Modernization includes angled deck, stress corrugals, high-capacity landing gear, reinforced bow, increased fuel capacity and tractor ramp raised outside of the stern to speed aircraft spotting on sunny light deck.

Full capacity of the 1649A will be 6,000 gal., as compared with 6,500 gal. on most Super Constellation and 7,700 gal. on jet-tanker flying models.

Maximum takeoff weight will be 150,000 lb., up from 137,500 lb. on current Super Constellation. Maximum landing weight will be 125,000 lb. up from 117,000 lb.

Spacelast period will be 17,000 ft., even up to 4,700-mi. ranges. More than 16,000 lb. payload will be carried in more than 1,000 mi.

Fuel tank will be placed inside fuselage. Hydraulic system will be 5000 psi, with completely independent dual pressure systems and such systems operated in different parts of engine.

Extensive use of integral stiffening will be made in the structure.

### U. S., Britain Agree On Transpolar Routes

An agreement for exchange of transpolar routes between Los Angeles, San Francisco and London has been reached in negotiations between the American and British governments in Washington.

In a week of discussion, the group decided on reciprocal rights for American and British carriers on the polar route between the West Coast and England. The agreement also agreed on reciprocal authorizations for the New York-Norwich route now operated by British Overseas Airways Corp.

Discussions were headed off when the British group, headed by Sir George Clobbitt, Deputy Secretary of the Ministry of Transport and Civil Aviation, left for the International Civil Aviation Organization meeting.

The U. S. delegation was headed by J. Paul Farrington, director of the state department's Office of Transport and Communications, and Chas. Gaines, a member of the Civil Aeronautics Board.

The Washington discussions have left unresolved a number of controversial route questions. A chief British aim is to complete around the world route by flying over the United States using New York, Chicago and a West Coast point on a London-Sidney route.

Routes sought by American carriers include traffic rights between London and Rome and others to the east to implement a route recently granted Trans World Airlines by the CAB. The new authorization connected Frankfurt and Zurich, thus connecting London and Frankfurt with TWA's main line to the south and east.

Another right sought by an American carrier is entry of Northwest Airlines into Hong Kong. This route was granted to Northwest by the CAB in the trans-Pacific route case, but it also made an authorization from Britain.

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## SAC to Integrate Spanish Bases Into Global Complex by 1957

Madrid—U. S. Air Force installations in Spain will be sufficiently near completion within two years to be integrated in Strategic Air Command's round-the-world series of bases.

Two of the four establishments under construction, Tuxtepec and San Juan, are scheduled to be fully operational by 1957. Two others, Minaca and San Pablo, will be in enough shape by then to be available for customer use.

Additional buses are planned, subject to Spanish consent. The Spanish government has authorized preliminary work on three new lines at Hips (between Seville and Córdoba), Los Llanos (Albacete) and Alcañiz (south-west of Barcelona).

### Self-Sufficient Complex

The Spinix base complex will be an entity in itself. According to available information, a SAC Air Division Headquarters will be established here. Bombers will not be permanently assigned in what might become known as the Iberian Command, however. They will follow the peacetime rotational training system, coming here for limited assignments periods.

U.S. Air Force interception will, of necessity, cover Spain against infiltration until the new American equipped and trained Spanish Air Force is able to take over. At present Spain's inventory consists of obsolete, piston-driven Junker 52, Heinkel 118, Messerschmitt 109, practically no anti-aircraft guns, no radar. This deficiency is gradually being remedied by the U.S. military aid program. First unit of Spanish Span has received a new's evaluation is set from North Lockhead T-330. It is planned to provide Spain with a 3rd-and-a-halfth division wing, one of about 235 North American F-86 Sabers. First deliveries are scheduled for early '63.

### Strategic Advantages

The SAC bases in Spain have several strategic advantages:

- They are close to potential targets in Eastern Europe and the Soviet Union without being too vulnerably exposed.
- They supplement the SAC bases in French Morocco
- They can compensate possible loss of suitability of American bases in England (While Britain boasts its long-range bomber force to full strength, the Royal Air Force may need more)

- Weather in Central and Southern Sweden is clear most of the year.

### Advanced Construction

Constructive week is most advanced at Tuxedo and Simpson.

At Tepic, 15 miles east of Madrid, an existing runway is being extended at both ends to a total length of 11,800 feet and broadened to a width of 200 feet. An oxide of asphalt and concrete will bring it up to strength requirements. Work has started on other paved streets, utility trenches, and parking areas to be provided with subsurface drainage.

Contracts for the "first phase" construction program were awarded Sept. 24, 1994. The job is scheduled to be completed by mid-March 1996, the base will be available then for semi-operational use by SAC's lowest bidders.

The Sargento base will be in two sections: Sargento Field, presently a Spanish Air Force establishment and Sargento's civil airport, and Valencuela whose projected 11,300-foot runway and complementary installations still are in the drawing-board stage. Sargento's open and theory development began Sept. 24, 1956, and due to be terminated by Dec. 17 this year, has reached the concrete-pouring phase.

Eventually SAC bombers will operate out of Valeriyevka, while reconnaissance and possibly long-range fighter escorts will be stationed on the adjacent Saurmoa segment of the base.

## Laboratory Supply Depot

Work at Macon, 35 miles from Seville, has been held up because of delays in land expropriation. Construction, when it starts, will be from scratch. There is nothing new but fields, olive trees and a few farms. Contracts totaling \$2.5 million for building a 13,800-foot runway, taxiways and part of the parking apron were awarded May 18.

Minatitlán, work has started on an office-laboratory building on the edge of the Mazón site. The road connecting Minatitlán with the Simla highway is being improved, it is in such a bad state at present that all it can handle is donkey traffic. Once begun, five-phase construction at Mazón is third to be completed in 570 calendar days.

The fourth base, at San Pablo, will not be for exacting conditions. It will



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## "Big Stick" ... jet age version

### TEMCO HELPS BOEING BUILD B-52 "RETALIATION" FLEET

Thunder of the B-52's eight jet engines is heard clearly at conference tables today, for this sleek giant can, by refueling in flight, strike with an H-bomb load at any point on earth. The threat of this fearful retaliation is impossible for an aggressor to ignore. The Air Force has ordered a fleet of these planes and they have performed their mission to perfection if they never have to drop a bomb in combat.

Producing planes fine enough to preserve the peace is an awesome responsibility for our aircraft industry. Boeing-Wichita, in starting second source production, called confidently upon TEMCO to produce a major component of the vital B-52, for previous Boeing sub-contracts on the B-47 Stratojet had firmly established TEMCO's reputation for producing a quality product, on schedule, at the lowest possible cost.

**ENGINEERS** If you are interested in a profile with a growing weapon system organization, write full particulars to E. J. Reeves, Jr., Engineering Personnel, TEMCO Aircraft Corporation, P. O. Box 6191, Dallas 2, Texas.



Taking up for the B-52 job, these TEMCO workers are building the huge jigs in which major fuselage sections will be fabricated.



function as a supply center serving other SAC installations in Spain. San Pablo is Boeing's airport and is well provided with aircraft maintenance facilities. SAC's Air Materiel Depot, as it will be called, still is in the planning stage.

Construction of a 10-mile, 700-mile-long fuel pipeline to feed the air base started at the end of May. Extending from the now-building Naval Port and Air Station at Rota, near Cadix, the pipeline will terminate at Segeam. Extensions will be added to connect it with present lines and new others that may be built. Building time 425 days. Segeam's tank farm will have a total fuel storage capacity of 4.5-million barrels.

Protective mine areas is slated to begin laying in June.

#### Planning Program

Overall coordination of the base program in Spain is the responsibility of Maj. Gen. August W. Kerner (USAF), chief of the Joint United States Military Group here and direct representative of the Secretary of Defense.

Planning is done by Architects-Engineers Spanish Base (AESB), a combination of four American architectural engineering firms. Selected by a joint Navy and Air Force board, the four are McHale & Eddy, Frederick B. Harris, Inc., Shaw, Mott & Dolan and Peters & Lomen.

Supervision of construction is the task of the U. S. Navy's Bureau of Yards and Docks. Prime contractors are Brown-Burman-Walk (Brown & Root, Inc., Raymond Concrete Pipe Co., Walk Construction Co.). Sub-contractors are let to Spanish firms if they are able to do the job. Spanish labor is employed.

Under the terms of the second signed with Spain Sept. 25, 1953, the bases are to be operated jointly by Spain and the United States. The latter paid it for a period of ten years extendable by mutual agreement for two successive periods of five years.

Workable use of the bases by the U. S. Air Force is subject to Gen. Franco's consent. Article 2 of the Spanish-American Defense Agreement says "The time and manner of maximum utilization of said areas and facilities will be as mutually agreed upon."

### Convairs Replaced

Pan American World Airways is replacing Convair with DC-8's equipment on its Miami-San Juan run. The Super will make daily flights on Convair, Montego Bay, Kingston, Port au Prince, Haiti and Ciudad Trujillo.

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RESHOOTED TOW TARGET capsule at 900 mph. Flight lasted a B-7, and extensive plastic production, work in progress at right.



## GAC Banks on Diversity and Research

By Henry Lefter

**Alcoa**—The aviation company that depends largely on subcontractors is somewhat like a man balanced on a high ledge. Any sudden shift in the wind may topple him.

In the aircraft industry, these shifts are likely to be the result of changes in defense procurement.

Cancellation of prime contracts naturally washes out associated subcontractors. Or a prime may find that cutbacks leave him with insufficient work for his engineers and production personnel, and induces subcontracting to keep his own team busy. Or the prime may feel that he can maintain better profit margins by doing the work in his own shops.

**Goodyear Aircraft Corp.**, which depends in a large extent on subcontractors, has felt these sudden shifts quite. The solution, as seen by GAC's management, is diversification and development of the company's own products.

A primary part of the solution is a constant attack against what T. E. Kewels, vice president and general manager calls the "factor of ignorance," something off the rough edges that keep us from getting top performance and value from present materials, techniques and structures.

### Evening the Field

**Goodyear Aircraft Corp.** is a wholly owned subsidiary of Goodyear Tire & Rubber Co. Although the company does not back down its spending ap-

proach for subsidiaries and divisions, some subsidiaries of GAC's are may be gathered from explosive structures. The Goodyear supplier had 95,000 on its worldwide payroll in 1974, with about 75,000 in U.S. plants. Of this total, Goodyear Aircraft employed 12,000-15,000 at Alcoa and 2,000 at Litchfield Park, Ariz., and Radford Arsenal.

So, perhaps a few years would be that GAC was responsible for one-fifth to one-third of the company's 1974 sales of \$1.1 billion. Goodyear Tire & Rubber had its peak year in 1973, when sales totaled \$1.2 billion, but on the basis of last quarter reports may exceed that this year.

In keeping with its policy of diversification and research, GAC maintains a sizable staff of engineers. A glance at

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4	125VAC	1.0A	15	10 ± 10%	10	10	10	10
5	125VAC	1.0A	15	10 ± 10%	10	10	10	10
6	125VAC	1.0A	15	10 ± 10%	10	10	10	10
7	125VAC	1.0A	15	10 ± 10%	10	10	10	10
8	125VAC	1.0A	15	10 ± 10%	10	10	10	10
9	125VAC	1.0A	15	10 ± 10%	10	10	10	10
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SEDA electronic beam was originally developed by Goodhue Aircraft to meet its own needs. Shows a NMA amplifier.

photo in use for the vertical strike test. Goodhue also produced radars for Grumman B-36.

The radomes consist of radome glass made of glass fiber-reinforced polymer resin molded in matched dies, with a finished in place cover. The radomes are gas-tight and under heat and other test loads which trigger a photo-sensitive catalyst that starts polymerization. Size finishes is maintained within ±0.05 in.

To make these radomes superior to most others, GAC developed a special coating, which it calls 31-56.

Among GAC products successfully made in production at Landfield Plant of high through laminated plastic (Klar) for a some weathered use, the first successful application of the material for this purpose, according to the company.

### Avionics & Electronics

In response to GAC's own needs, company engineers designed and built the Grads (Grads Electronic Differential Analyzer) analog computer and its associated equipment. Now it is being sold to universities and industry research groups. Part of a basic Grads is about \$15,000. Complete installation, including the basic GN-251.3 linear analog computer plus other units, can be about \$40,000.

The G-3 can solve 12th order differential equations involving 10 varied conditions. Its utility is expanded by addition of the NT non-linear analog computer, incorporating as many as ten NMA multiplier units, RS in channel recorder or RS two-channel post-recorder, 11 error plots and 311 impedance loads.

Among the problems Grads can solve are those dealing with stability and dynamic performance, sensor characteristics, aerodynamic rigidity and control, engine during helicopter take-off and landing, dynamic stresses of moving parts, fluid and heat flow, heat-

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# Silicone News

FOR DESIGN ENGINEERS

### Founder Celebrates 25 Years' Service To Silicone Industry

In 1933, Dr. F. H. Hyde first started his investigations into the field of organic silicon chemistry. His work, which presented that at any other chemical in this country led to the first commercial production of silicone.

Frank Hyde received a master's degree in chemistry from Syracuse University in 1934. He then resided in the graduate school of the University of Illinois and received his Ph.D. in organic chemistry in 1937.



Dr. F. H. Hyde

Hyde's work in the field of silicone chemistry began the day he was hired by Dr. R. C. Williams at Corning Glass Works in 1938. His first project was to explore the possibility of incorporating organic chemical groups, one plus another, to increase their shock resistance and flexibility. This investigation led deep into the work done by Prof. F. S. Kipping of Nottingham University (England) in the field of organosilicon chemistry. Applying his entire imagination to Kipping's findings, Hyde produced silicone polymers with the very properties that so rapidly propelled the silicones into almost every phase of American industry.

Frank Hyde started on his own exploratory work in the silicon field at Corning about 1951. He then transferred his laboratory to Maitland, Michigan, to be closer to aerial science operations in Dow Corning Corporation which he continues to apply his research ability in producing more and better silicone products.

As his time, many people paid to visit his laboratory. TO THE MAN WHO HAS PUT IN THE WORLD TO PRODUCE A USEFUL SILICONE AND ON WHOM WORK AN INDUSTRY WAS FOUNDED DR. F. H. HYDE

AWARDS • CHICAGO • CLEVELAND • DALLAS • DETROIT • LOS ANGELES • NEW YORK • WASHINGTON, D. C. (Silver Jubilee, 1963)

Canada: Dow Corning Silicons Ltd., Toronto. Great Britain: Milled Silicons Ltd., London. France: Dow Silicons, Paris.



### ALLIS-CHALMERS ANNOUNCES ALL-SILICONE-RUBBER INSULATION FOR LARGE MOTORS AND GENERATORS

Allis-Chalmers Manufacturing Co. has announced development of the first all-silicone rubber electrical insulating system for large motors and generators. Known as SiloFlex, this new Class B insulation increases the life and efficiency of rotating electric machines by providing greater overload protection and maximum resistance to vibration, moisture, shock, and vibration.

Made with Silenite<sup>®</sup>, the Dow Corning silicone rubber, SiloFlex is differentially applied to all types of rotating machines. As shown in the figure, delivers a strength of 1.75 inch-dia. over 34 hours at 250°C. remains practically constant over a temperature span ranging from 0 to 150°C. Dielectric constant decreases gradually from 3.2 to 2.2 at 250°C.

In manufacturing Allis-Flex insulated motor coils, Silenite is applied to the conductor and vulcanized into a homogeneous mass by the application of heat and pressure. This provides a continuous and impervious dielectric barrier which provides a flexible, uniform and heat resistant shield over the entire coil structure including leads.

SiloFlex insulation is exposed to change along all the major application patterns in the utility and industrial fields. In power plants, industrial shafts, motors, for example, the obvious effect of atmospheric humidity and dry air will have little effect on the inherent all-silicone-rubber

system. Motors in service, are cooling and surface interchange will retain high overload capacities despite reduced insulation resulting from dust accumulation in ventilating passages. In the chemical, paper, food and similar industries, applications that formerly required costly enclosed motor frames may now be applied more efficiently and economically with SiloFlex insulated non-enclosed or open type frames.

Allis-Chalmers is already building large SiloFlex insulated machines in the 2500 and 4000 volt class. These will be priced on the same basis as previous units constructed with ordinary Class B insulation. A Corning also expect to extend the advantages of the all-silicone-rubber system to a wide range of high and low voltage rotating equipment.

No. 47

ALLIS-CHALMERS, 1963, INC.

### Design Edition 10

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**ARMA** ADVANCED NAVIGATION SYSTEMS

ing and radar systems and fire control GAC is a true subcontractor in the systems field. The company has designed and is building for General Electric the antenna for the F78 lightfinder radar, with its 30 ft retractable dish.

Another project is the antenna for a Decca surveillance ground radar. Strong enough to withstand 75 knot winds, this unit can be "knocked down" and is light enough for air shipment.

Goodrich is also working on missile guidance systems and produces some rare tubes.

### Metal & Missiles

After some time, the company has been permitted to reveal its part in the Nike production program. Both at Alton and Litchfield Park plants are involved. Missiles and other construction are handled at Alton, and the big bags and envelope at Litchfield. Assembly is in the bags, 16-1800 sq ft, at Alton.

The company is now working on both 8 (short, short stage) and P (long, long stage) missiles for anti-air and aircraft early warning systems.

The weapons-GAC supports voice at the word "bang"—are of steel and construction the nose and tail sections are rigid, the large lifting section is the motor is new rig. The cut is supported by a system of steel cables local

Goodrich produces wrap and coverings for the T-38 trainer, under subcontract from North American Aviation.

The work is done at the Litchfield Park plant.

Under present schedules, the contract will extend into 1957.

Boeing's KC-87G tanker carry the fuel for inflight refueling of thirty jets in Goodrich built metal tanks. Each plane carries 15 tanks, of several sizes.

In addition, GAC makes personalized metal wing tanks for the B-47.

### Airship Program

As to the past, production of airships for the Navy is one of Goodrich's major production programs. Both the Alton and Litchfield Park plants are involved. Metalwork and other construction are handled at Alton, and the big bags and envelope at Litchfield. Assembly is in the bags, 16-1800 sq ft, at Alton.

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through the top and bottom of the rubber and fabric envelope.

The metal framework of the control car is built in several members, which are then joined. Goodrich's Bendable sandwich—in the case aluminum alloy being with hull cross—its sand extremely in the car.

### Sandwiches

Goodrich produces its Bendable products with various face and core materials and with both square and hexagonal honeycomb cells.

Core are made of solid balsa wood, aluminum foil, stainless steel, fiber glass, paper or cotton. Secondary, and known as cellular material. Face materials include aluminum (structural and non-structural applications), stainless steel and titanium (where high strength and heat and corrosion resistance are wanted), magnesium (low density, high stiffness applications), unsaturated polyester glass cloth (radomes), and paper (baggage racks, partitions, non-structural applications).

GAC used Bendable phenolic honeycomb type in primary wing structure as its GAC 22A. Dike because transport design. The company uses the Dike in the first civil aircraft using honeycomb material for primary structure to get GAC contribution.

A subcontractor for Panavia in



WORKING only from the head side, operator sets Du Pont aircraft Rivets... up to 32 in. inside

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"How?" you cry. Ask Kelsey-Hayes Metal Products, Inc., of Detroit, Pa., members of parts for the Republic F-84-F "Thunderbolt." Before switching to Du Pont Rivets, it took two men forty minutes to fasten patch plates to drop-pin formers in the fuselages' "bird-cage" sections. Now two men save done the job in less minutes—and with better results. No more costly rework—Rivets need no deforming backing bars.

In fact, Rivets are so easy to use 15 to 20 a minute can be set down "blind." Slip rivets into drilled holes, apply heated press to head. Rivet expands, fills holes almost instantly, locks parts solidly together. That's all—no expensive after-damping required.



## DU PONT AIRCRAFT RIVETS



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the B-27 helicopter. Goodyear used halonone Rivets extensively in the cockpit's shell.

### Other Projects

Among recent GAC projects that these Rivets are used:

• **Highspeed tow target.** The all-metal 1,400 lb. craft can be towed behind a B-47 at speeds over 500 mph. Its mass of offset towing to one side of the B-47, close simulation of a jet fighter pass is generated.

The target ship lands on a d-d-type runway and is slowed by a dragrope cable when the tow cable is released. Repeated reuse is possible.

A small diesel engine generator provides power to operate air-to-air guided devices on the craft.

The tow target, designed and built by GAC in cooperation with the Aircraft and Tow Target Unit of WADC's Engineering Laboratory, is now undergoing extensive Air Force tests.

• **Chacoan copier.** Goodyear says the military is interested in the GA-400R, a small copier built with its own money. It could be used as a counter vehicle or for tactical assault by ground troops (AWM Mar 30, p. 7).

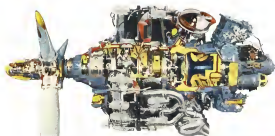
Key consideration in design of the 400R, craft was to count up with an item that could save time production quickly and easily, in emphasis was put on use of commercially available materials. Plywood is a water-cooled 15 hp Johnson Seaforce outboard motor, coupled to 13 hp. The airframe is of welded aluminum tubing supported by steel outrigger tubes on aluminum sled skidding gear.

Main rotor has two laminated wood blades mounted in steel hub under drive from actuating levers. Two-bladed tail rotor, operated through rubber cables connected to its collective pitch mechanism, is of formed aluminum sheet. Overrunning centrifugal clutch gives smooth start and stop without loss of power.

The copier, capable of 60 knots speed was designed, built and flown in 16 weeks. Douglas is Phil Zachary & B-52 bomber. GAC's Airplane has a contract for production of B-52 Superfortresses now built. This is the first time Lockheed P-3 has made ground-handling equipment. Other projects of this plant are production of optical compass, reinforced plastic parts on ship navigators and gun logs, electronic subcompact work and T-25 assemblies.

### Executive Fleet

Goodyear Tire & Rubber owns one of the nation's largest fleets of executive aircraft, between 15 and 40 in present. The Aviation Products division is responsible for the fleet which

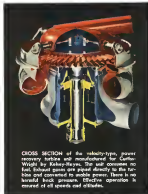


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includes five Lodestars, a DC-3, a two-engine Beechcraft, a Bonanza, Cessna, a Stearman, an amphibious Ducker and two Dukes. Goodyear also has a number of aircraft on loan from the government for special projects. A crew of 11 mechanics and radio specialists maintains the business fleet.

In addition Goodyear maintains two 125,000-sq-ft hangars—the Enterprise and the Ranger.

The Aviation Products division, which comes under the parent company and is separate from Goodyear Aircraft Corp., includes among its products aircraft fuselages, wheels, valves, tires and engine exhausts, landing flaps for helicopters and land and sea planes; all types of aviation hose; Airbus products for engines, flood and ballast-treating fuel and oil cells, propeller and wing components, and various-related aircraft products.

## Soviets Build Up Industrial Base

Two official reports from official Russian sources indicate the size of the industrial base for Red superpower.

• Aluminum production has more than doubled since 1951.

• Airport terminal construction has been approved for 20 major Russian cities.

The government newspaper *Izvestia* says aluminum output increased 140% from 1951 through 1954 (the last five years of the 5th Five-Year Plan). For 1955, a further increase of about 10% is planned.

A U. S. government survey of Soviet blue economy estimates Russian aluminum output for 1952 at 235,600 metric tons.

New airport terminal buildings will be started in Minsk, Stalino, Adler, Pskov, Nikolayev, Tallinn, Alma Ata and Chelyabinsk during this year as part of an ambitious airport construction program at high traffic points.

Last year Russia completed terminal buildings at four stops—Krasn, Sevastopol, Krasnodar and Khabarovsk—in the transcontinental route from Moscow to Vladivostok.

## 600F Oil Filter

Aircraft Power Mfg., Inc., Glen Cove, N. Y., has been awarded an Air Material Command development contract for an airborne hydraulic oil filter designed to operate at 600F and meet MIL-F-8864A specs for 10 micron removal. Unit will employ Micro Metallic Corp.'s Sphagnum filter media.

APM also has set up a glass bead filter calibration service to evaluate filter performance, stated to be sensitive over the 5 to 60 micron range.



Illustration is approx. two feet's actual size

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No vibration mounts or other trouble causing gadgets are employed to accomplish this. The resistance to shock and vibration is built in the instrument mechanism itself. For further information request technical data on Type 75 BARORESISTORS.

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F4D PLATFORM goes off its conventional roots at attack, and loading characteristics

## Ten-Minute Killer Mission Guided F4D Skyray Design

By David A. Anderson

A ten-minute mission, flown at zero mass power, is the major job of the Douglas F4D Skyray, about to go into service with U. S. Naval air units to provide top cover for carrier task forces.

Its primary mission is to kill enemy bombers making 500 knots at 40,000 ft., before they reach the deep point for an attack on the carrier or the area being protected.

Built into the developed delta layout of the Skyray is the capability to climb to 40,000 ft. in less than five minutes and to follow this ascending performance with five minutes of sustained altitude and maximum power.

Compled to this high-speed climb is equivalent to the supersonic performance of the intercepter at low altitudes. Current cruise record at a blistering 728 mph, the Skyray fighter also holds the 34-in. speed record at 553.4 mph. Both records were set in low-speed power near the 100-ft. altitude mark, and both were set with the experimental airplane powered by a Westinghouse J40-WE-5 pilot afterburner.

Production models are equipped with the Pratt & Whitney J57-P-2 turbojet with afterburner. On the first flight of the first production airplane with this

engine, Douglas testpilot Bob Kahn flew through Mach 1 in straight and level flight. On another flight, the plane went from a standing start to 10,000 ft. in 53 seconds.

### Configuration

The philosophy of the F4D is its chief recognition feature and one reason for its performance. By using a highly swept, low-aspect-ratio geometry, Douglas aerodynamicists brought their best compromise low drag for speed, low wing loading for ultimate maneuverability and good stability, and control qualities at the approach and landing speeds associated with carrier operations.

Gross wing area of the Skyray is 577 sq. ft. with an empty gross weight near 20,000 lb. For normal operational conditions, the take-off wing loading of the F4D is about 36 psf. At the start of combat, this loading will have dropped to somewhere around 34 psf.

Leading edge controls are droop and trimmable leading edge slats are fitted, and there are four air brakes (two on upper and lower surfaces near the fuselage and wing trailing edge).

Douglas F4D is subject of a long effort by Simon Engineering Editor David A. Anderson and David Moore. Design study began about the production models, see p. 49

Outboard portions of the wing fold upward the carrier storage. Wingspan of the unfolded surface is 33 ft. 6 in.

Vertical tail is a conventional swept surface with quiet stallon.

Overall length is 45 ft. 8 in. and height is 17 ft.

### Powerplant

Four separate types of engine have powered the F4D during its development since the first flight Jan. 21, 1951. First two XP4D-1 prototypes mounted Allison J35-A-17 turbojets rated at 5,000-lb. thrust. The Allison engine was a temporary expedient until the first Westinghouse J40 was available.

First Westinghouse engine to go into the plane was the J40-WE-5 without an afterburner. This also was a test engine until the afterburner engine was available. The J40-WE-5 equipped with afterburner was later installed and powered a prototype to two-speed records.

But some months before the records were set, the Navy had decided to switch from the J40 to the Pratt & Whitney J57 on production airplanes as a matter of necessity to meet delivery requirements. The J57 was expected to have greater growth potential and lower fuel consumption because it was a more advanced design than the J40.

First production plane was powered with the J57 P-2 with afterburner. It is custom that later models along the line have later models of engine.

Gross weight of the F4D built by Aerospace, can be carried in three under the wing, balanced by a 100-gal fuel tank on the other side.

### Armament

Basic growth of the Skyray is probably the standard Navy complement of four 20-mm. cannon. But seven pylons mounted under the wings and fuselage point up the entire amount of external armament (more that can be carried by this aircraft).

Among these are alternatives to the standard armament: the F4D can take any of the following:

- Six rocket packages each containing seven 21-in. rockets
- Four rocket packages each containing fourteen 21-in. rockets
- Two 150-psf or two 300-psf fuel tanks
- Loads up to 2,000-pounds on each of the two wing pylons

Current all-weather capability of the



HIGH ANGLE OF ATTACK accounts for longer than normal down-angle of F4D nose.



SKYRAY PYLONS can carry rocket packages to supplement standard 20-mm. cannon.



FOUR-POINT LANDING GEAR consists of normal bicycle gear and a tail wheel.



**F4D-1 IN SILENCER BUILDING** for engine testing. Ground turbine motor at left may be used on pilot motor long for airborne delivery to distant base.

Douglas intercepter makes use of the Aero 118 fire control system, incorporating ARQ 184 radar and the M-16 sighting system. Further development will integrate an automatic light control system into the fire control unit so that the airplane will track and aim automatically.

#### Systems

The F4D is one of the few airplanes with front-point landing gear. The normal tricycle gear is supplemented by a tail wheel, necessary for the high angle of attack operations peculiar to intercept with low aspect ratios. But Douglas engineers were able to save the weight of the extra wheel through reductions in the length of the nose gear and main gear.

Two independent hydraulic systems handle the full-power controls of the F4D. Direct manual control is available if the engine stops or if both systems fail.

#### History

The Skybolt, for all its advanced configuration, is eight years old. In 1947, Navy's Bureau of Aeronautics started Douglas engineers under Ed Heise to investigate a delta wing design as applied to an intercepter. After one year of study, the design team came up with the basic layout of the F4D which has been changed only slightly since. Three months later, they decided that there was more than glider-like selection in developing a configuration. Model tests proved that there was three important parameters: sweepback angle, aspect ratio and thickness.

Final selection of the F4D wing geometry was made in 1948. Subsequent wind tunnel and flight tests have proven the characteristics of the layout to be all the Douglas engineers hoped they would.

Hessinger points out that the final proof of the optimum of the design depends on what the final opponent shows. Moreover, he cites three major considerations to be drawn from the Skybolt development:

- **Satisfactory stability and control** can be obtained with this layout and will not be hampered by high subsonic, transonic and supersonic speeds.
- **Drag advantages** in these speed ranges apparently come from the highly swept, low aspect ratio wings compared to more conventional arrangements.
- **Outstanding takeoff and landing characteristics**, coupled with superior high-altitude maneuverability, result from the low wing loading of this type of configuration.

### Study's Objectives: Improving TAC

Buffalo 841 is the project code name for a broad approach to the many problems of Tactical Air Command currently being studied by the Conneli Aeronautical Laboratory.

The study area at these objectives: improving the maneuverability, operational effectiveness and weapon effectiveness of the tactical air unit. The program was initiated by TAC in 1958 to improve its all-weather, thrust-the-look capability in any part of the world.

Specific activities of Buffalo 841:

- **Ground disposal of tactical aircraft** studies made by CAL's new methods department showed the advantages of VTOL aircraft, particularly those with a new engine concept giving potential thrust and reduced fuel consumption under cruise conditions. This activity is the major thrust.
- **Development of a simple and accurate navigational system for bombing and**

reconnaissance, with extended range and capable of operating at low level beyond the radar horizon.

Operational studies for improved combat efficiency. Among the subjects in this study were terrain avoidance during low altitude navigation, physiological effects of turbulence on pilots, control of radar display, sensorless use of low-altitude flight, and various other search techniques and electronic countermeasures.

- **Improvements in search and fire-control systems** to make them capable of finding, identifying and destroying targets in all kinds of weather.
- **Flight research on automatic stabilization of aircraft** to improve their characteristics as gunners and bombing platforms on ground and air attack.
- **Evaluation studies of new offensive weapons** for tactical aircraft in terms of search, fire control and guidance equipment. This phase should give comparisons of various systems as well as point the way to new research.

Separate from the TAC study, the laboratory continues its activities in guided missiles.

Long-range interceptors and missile vulnerability have been studied as part of a task for Continental Air Defense, and a broad study of Soviet long-range defense has been completed during the past year.

### THRUST & DRAG

"Do we really appreciate the tremendous dependence of our nation on the aircraft and engine?" Do we fully realize that one man with an idea on how to guide an aerodynamic missile to its target with accuracy is worth thousands of men in uniform? . . .

"As the nations of the world come to depend more and more on scientific progress for their social, political, economic and military strength, the role of a relatively small number of men increases. And these are always few people with broad minds to carry on forward. We are too quick to oppose the idea that one man can make a more significant contribution than another."

"The concept that all men are created equal has dominated our thinking. To be sure, they are all equal before the law. But they are not all alike. Men cannot be treated like to many can control the assembly line. The too few or tribes of each man in making his contribution in the world is a matter of displacement, certain talent, or being different since in his own way."

—Rex Carl Hinchey (D, Calif.), Chairman of the Research and Development Committee of the Joint Chiefs of Staff on Atomic Energy



tic  
'tac'  
toe!

In the event of surprise attack, today's new and more powerful USAF Tactical Air Command can now carry war to the enemy anywhere in the world—around the clock and in any weather.

Here at a glance are some of the elements that might be used in such an attack and which are contributing to TAC Air's new mobility and striking power.

In modern warfare, major fixed bases are certain to become targets for aerial enemy action. The Martin Aero-length launcher makes possible swift mobility and advance-area operation of the TBM-1E Matador tactical missile and—if need be—of piloted jet fighters.

In addition, new versions of U.S. Air Force's B-57 bomber, a major tactical weapon, are now being developed for aerial.

And for tomorrow's Tactical Air Command arsenal, new and more powerful Martin weapons systems are on the way.

**MARTIN**  
BALTIMORE • MARYLAND





**DETRAIT RIDES TRUCK** from plant to Los Angeles International Airport for installation of engine, under check-out and preparation for flight. Details: a) elevator, b) upper midline, c) lower midline, d) pitch bracket, e) tail wheel.



**NEW NOSE SECTION** incorporates air scoop and nose fence (1965) leg may be locked in position to facilitate installation.



**NEW-WING STATION** for adding new section inner wings and fuselage box. Tearing between fuselage and wing cannot take area.

## F4D Meets Challenge of Engine Change

By Irving Stone

Terrebonne, Calif.—Reengineering the Douglas F4D Phantom II to have the P&W F47 engine was a big job. Douglas designers and production men frantically for a last month which saw the first F47-powered Phantom come off the line and fly just 13 months after approval was given in April 1953, to switch from the Westinghouse J48. Delivery of first production plane was made June 5, 1954.

In the switch, about 50% of the structure, installation and specifications came under new engineering change. Production proceeded along with change making, so that the plane was well along the line while some of the fringe items—doors, scoops, etc.—were still in the

process of being designed.

This close liaison between engineering and manufacturing has led to a well timed production line.

### Major Assemblies

Structure of the F4D-1 breaks down into 14 assemblies: Center wing, outer wing, upper midline, lower midline, vertical stabilizer, inner and outer elevator, pitch bracket, left fuselage edge fairing, junction, nose reference, junction, nose, scoop and duct, cockpit enclosure, dorsal panel and its internally, top of fuselage (or engine bay), fuselage box (or engine access door) and tailcone.

All these units are interchangeable, ship-to-ship. The degree of interchangeability, because effective with the 11th engine.

New fuselage-side incorporates the air scoop and the inner frame, which rest into the front spar. Forward of the nose frame and aft of the cockpit is the radio compartment. Skin flaring on the left side of the nose encloses the battery (starboard) and auto pilot (port).

While the fuselage nose is being built and complete installation made in it, the inner wings (struts) and the dorsal panel (upper fuselage portion) also are being assembled. These two major components are fed into an adjacent set-up jig for the joining operation.

### Movable Line

Taken out of the set-up jig, the assembled unit proceeds along a movable



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- **Shielded Wire** connectors for microelectronics coupling of conductor and shield. Wire size range #12 to #14.
- **GEOMETRIC THREAD HAND TOOL**—crankers and levers. — connectors have emergency dies in #12 to #14 and #14 to #12 sizes.
- **A-MP AUTOMATIC WIRE TERMINATOR**—makes thousands of perfect solderless terminations per hour.

With these, as with all A-MP products, A-MP's thorough engineering results not only in uniformity and precision of performance but ensures greater safety in the use of the end product.



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**AIRCRAFT-MARINE PRODUCTS, INC.**, 2100 Paxton Street, Harrisburg, Pa.  
In Canada: **AIRCRAFT-MARINE PRODUCTS OF CANADA, LTD.**, 1764 Avenue Road, Toronto 13, Ontario, Canada.



**MATING LINE:** New wing and fuselage box have been joined.



**DOUBLE DECK:** final line, with mobile work cage inside F4D



**F4D LINE** is moved in two lifts. How the engine is moved to go down the line for final work, except for painting



**ANOTHER VIEW** of double-deck final assembly line. This is mounted on elevated platform by rollers attached to steel rails.

able line for incorporation of wing subassemblies—wing, gas ports, control brackets, cables, torque tubes, hydraulic units, etc. on left-hand side. On the movable bar, all pre-assembled wing in the zone is connected to main supports by wing by permanent splines.

From this line, the structure moves to the mating pit where the final tail cone and vertical stabilizer are hooked up.

At this point, subassemblies have been subassemblies completed in the main shop wings, vertical stabilizer and dual panel (engine box). So the main assembly bar (11-400 ft long with 14

stations) is used to install wing components such as outer wings (complete with ribs, slats and wingtips) upper and lower rudders, main elevator on both wings, tank section at rear portion of the main wings, main landing gear, nose gear.

This arrangement permits early start of numerous operations and check-out

operations on the main assembly line. This is completed on this main assembly line, except for painting.

On the main line, the structure is supported on an elevated track platform by rollers attached to each wing stub at the middle vertical spar rail, the structure then becoming an own fixture. The movable platform on



**SKYRAY** IS LOWERED from double-deck assembly line. The plane is now ready for trucking to Los Angeles International Airport for engine and other installation

#### Feeding the Factory

Special food wagons serving the production personnel on the F4D line save time and are convenient.

These vehicles, carrying hot food, are brought to each general working area, where there is a special lunch service. Food is served hot and there are no long lines.

Between lunch periods, these vehicles are used as conference rooms.



**TWIN COACH**

*helps give the Sabre its edge*

Famed for its combat experience with the United Nations in the skies over Korea, the Sabre Jet is now being supplied to other NATO countries.

Twin Coach Aircraft Division was selected as a subcontractor for large and intricate mechanisms for the F-86 as well as for North American Aviation's other high performance aircraft, the F-100 and F-104.

These important assignments are typical of the way in which leading turbine manufacturers rely on Twin Coach as a source of major aircraft assemblies.

If you have an assembly you're considering subcontracting, call Twin Coach for consultation. Our aircraft experience . . . our 33½ acres of plant and facilities are at your disposal.



Twin Coach Aircraft Division plants have out wing spars, main wing panels, flaps, complete engine sections with plumbing and electrical wiring and other large assemblies

OTHER DIVISIONS OF TWIN COACH COMPANY MAKE: Turbine Vex and Pacer Engines Thrusters, Rocket Engines and Propellers Engines, Turbine Engines, Diesel Engines



**TWIN COACH COMPANY**  
*Aircraft Division* BUFFALO, N.Y.

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## USAF Contracts

Following is a list of recent contracts  
awarded by the United States Air  
Force.

**W. P. Smith Co.**, Dayton, Ohio, has  
been awarded a contract for the design  
and development of a new aircraft engine  
for the USAF. The contract is for the  
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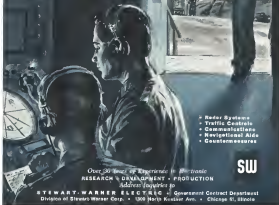
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## PRODUCTION CAPABILITY

► **Thomas Carparts Co., Portland, Ore.**, has moved into a \$5,000 sq ft plant which more than doubles its piston investment casting and shell molding facilities.

► **Special thread outer maker** 114-capacity pipe threads and averages over 1,000 linear feet of threads between grids, for a total of 10,000 ft along the cutter's life. Cutter is employed on a planetary thread roller in which the work is held stationary and the cutter is cycled automatically inside. Auto

backlash feedback is used to extend tool life and prevent chatter milling. Devices developed by screw machine unit of General Electric Co., Pittsfield, Mass.

► **Electronics, Inc., N. Hollywood, Calif.**, has obtained U. S. patents on its solid film fabrication process, stated to operate in temperature range of -100F to +750F.

► **Patco Construction Co., Hillside, N. J.**, has secured a \$412,500 contract from Port of New York Authority to build a postoffice in Newark Airport's

terminal and express building. PNYA also has granted a 10-year lease to Gulf Oil Corp. for a 11,000 sq. ft gasoline service site at the field, at an annual rental of about \$22,400.

► **Computing Devices of Omaha, Neb., Omaha**, has been appointed exclusive Canadian agent for Kern Instruments, Inc., makers of transducer, semi-conductor and specialized components.

► **International Staple & Machine Co., Hiram, Ill.**, has been appointed national distributor for Van Linder materials handling equipment by Hulscher Manufacturing Co., Solon, Ill.

► **Rev Corp., West Acton, Mass.**, has completed new production facilities for production of Atom Glas, a cost saving sheet used in aircraft engines and other applications.

► **Belden-Lane-Bushman Corp., New York, N.Y.**, has acquired Radio-Front, Inc., Cambridge, Mass., industrial testing equipment and electronics firm.

► **Wyman-Corbin Co., specialist in large forgings for aircraft**, has opened its office at 1638 Wilshire Blvd. in Los Angeles, Calif. Its chief is Alan T. Bousquet, Assistant to Harold E. Bousquet.

► **Engineering employees at Boeing Airplane Co. in Seattle and Wichita** plans accepted a new agreement that includes a 5% wage increase, new pension plan and higher overtime pay.



**CONVAIR SAVES \$15,000** annually using double action pressure drill carbon steel in our operations skill and craftsmanship meet over holes for attachment of our photo-optometer mounts mounted in aluminum holes when the rigging is scratched, the non-drill expands pulling the combination drill-controlled into the sheet. The Window Engineering Corp. had a couple of drilling up to 1 in. diameter off.

**ANOTHER MICRON GEAR ACHIEVEMENT**... It has been our privilege to cooperate with the Aircraft Products Division of Mustang, Maxwell and Moore, Inc. of Danbury, Conn., in producing the 3-stage planetary gears for the Type 141R43 Turboprop Control Motor designed by them for the automatic control system installed by Westinghouse Electric Corporation into Chance Vought Corsair fighter planes. This assignment calls for manufacturing of the highest order, scale of stringent endurance, insuring of maximum accuracy. Gears for the two planetary stages close to the motor are cut in Alpha Class Precision 3, while the output stage is cut in AGMA Class Precision 3. Overall reduction of the gear is 1040:1. Maximal backlash is 0.6 degree from motor to output.



All three planetary stages operate within a single piece of stainless steel ring gear. Planetary run gears are stainless steel white phosphor gear cast and their integral gears are non-machined hardened copper. All planetary gears are furnished in precision ball bearings ranging upward in size from .003 inch bore.

**HIGH PRECISION  
GEARS**  
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These two great fighters incorporate HARTWELL Flash Latches for aerodynamic streamlining and simple, fast accessibility. The HARTWELL Flash Latch has evolved in our modern aviation age as the ultimate combination of protection, aerodynamically flash latches.

The flowing heavy duty flash latches for power packs and nacelle lock in place by toggle mechanism and applied hand holds them closed; simple toe-bolt and trigger opening action; they fit a wide range of structural variations.

The Access trigger-action flash latches are available in over 300 standard combinations of bolt and trigger offset for access panel and door applications; they afford quick access, safety and dependability.

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**DAMAGED SAFRE** is strangled on ground as cause probes in second wreckage. Modern crasher puts for signs of inflight failure.



**STATOR DAMAGE** is due to landing trouble in engine line crash prior to fall. Program is designed to develop flight safety officers.

## Pilots Study Accidents In Flight Safety Course

Wreckage from Navy and Air Force planes involved in recent accidents is being transported to sites at Norton AFB, San Bernardino, and the Naval Air Station, Los Alamitos, for investigation as part of the training course for flight safety officers at the University of Southern California.

This is the first attempt to give practical experience in accident investigation as part of an educational program, according to Dr. Louis Kaplan, Coordinator of Flight Safety Training at USC.

Problems shown in these patterns in an F-80D which crashed in a low-altitude accident at Norton AFB after the engine came loose after fuel system malfunction. Wreckage was transported to the Norton site to provide the flight safety students with an actual investigation problem. Such clues to the accident as "oil stains" on the runway, location of wreckage and location of the fuselage (in this instance the engine) are given the students. Cause of the accident is determined by classroom discussion and analysis, supplemented by examination of the wreckage.

The course of USC is designed to train Air Force, Navy and Marine pilots for duty as flight safety officers. USAF also participates. The program began a little more than two years ago.



**ENGINE CHECK** is made by Navy and Marine student officers.



**COCKPIT INTACT** is discussed by students with instructor.



**SAFETY TAIL** gets a going over by USAF students in safety course.



## COHRLASTIC PYLON HEATERS GUARD AGAINST ICE

... provide all-weather protection for the F-89D

Pylon fuel tanks hung on the lower wing surfaces of the U.S. Air Force's Northrop Scorpion F-89D increase its range without appreciably affecting speed. In order to prevent or remove ice accumulations on the leading edge of the pylons, COHRLASTIC heaters possessing multiple wiper blades for variable in-lift distribution for required areas were designed, in cooperation with Northrop Aircraft, Inc., engineered and produced as complete assemblies by The Connecticut Rubber Company.

Special silicone rubber heating blankets sandwiched between aluminum covers were performed and installed as complete assemblies. No change in the airfoil shape of the pylons was required because the outer surface of these light-weight, composite and

rugged heaters provides the desired surface.

All COHRLASTIC Heaters meet MIL and AF specifications. They are easy to install, easy to control, and can be adapted to any size and shape. Exclusive construction features enable these heaters to provide uniform heat distribution for unlimited durations over large or small surfaces. COHRLASTIC Heaters operate trouble-free in temperatures that range from -100°F to +200°F.

Perhaps COHRLASTIC electric-heated methods of protection can be applied with advantage to overcoming your serious icing problems in hard-to-heat areas. Our field engineers are available for direct contact.

Call or write today.



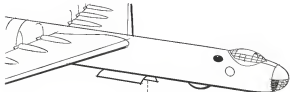
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If you have to "drop a bomb  
In a barrel"...

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BUILT TOUGH DIVISION OF  
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ELMIRA, NEW YORK

Write for new AC booklet now  
coming off the press, titled "AC  
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A barrel makes a small target, but if anyone can hit it, AC can.

For several years now, AC has built complex Bombing Navigation Computers for our biggest customers. And, because of AC's precision engineering, these units are pounds lighter, inches smaller, and thousands of dollars cheaper.

This BNC, as we call it, is one of America's most important weapons. But, it is only one of many ways AC has taken to supply electronic answers to navigation, bombing and firing problems.

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## Italy's Aircraft Industry Passing Through Its Most Critical Period

Rome—The Italian aircraft industry, passing through perhaps the darkest period in its history, at least can boast of highly qualified experts and considerable resources.

This is the only encouraging element in an otherwise gloomy situation, and gives hope that, with the aid of the Italian government and the Western Allies, the industry will weather its depression.

### Five-Year Plan

The industry's latest request, for a five-year plan and expenditure of \$100-\$120 million to be spent on annual repairs and overhauls and for the enlargement of experimental facilities is seen as vital for survival.

Observers say that this program will not obtain Italy's desired resources. They have hopes that the country's strength during internal political problems will make such a program could be put into effect, experts believe industry will have to look abroad to order from abroad.

### Stronger Air Force

Outlook of the Italian Air Force is much brighter. In 1954, Air Force fighter squadrons completed their conversion to jet aircraft. Of the 25 groups, 540 plane strength versus 100 in 1945.

public 1-1/2 and the remainder de Havilland Vampire and Fiat G-90s, used mainly for training.

It is impossible to depend on a group of Panhard C-119 Packets (30 planes in all) and some dozens of Douglas transports.

This modernization has been accomplished almost entirely through American aid, because of the strangling of the budget path on Italian aviation officials.

Each year, when the available funds have to be distributed between the several governmental departments, the Air Force receives an active campaign both in and out of Parliament, against its inferior position with respect to the other military services. The Air Force lacks its share of the present potential of the country. It needs adequate training facilities for the flying forces. Also it wishes to see made available the \$34 million needed each year in the opinion of Italian experts, to insure the efficiency of the existing plants of the Italian aviation industry.

### How to Spend It

In 1954, \$354.55, the appropriation spread out at a very critical moment of Italian history, which was found in 1955 million dollars. Having to choose between training the flight formations that are limited only growing in number.



## Tires Will Get 250-Mph. Touchdown Test

Airplane tire test wheel, for simulated landings at 250-mph. touchdown speed, will be used by Armstrong Rubber Co. to develop tires for future aircraft. Test wheel measures 30 in. in diameter. New equipment is installed in the Goodyear West House, Akron, plant.

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Humboldt to the supply provided by the U.S. and going on to the Italian engine factories, authorities indicated the requirements of the industry.

A large part of the 5-1/2 million which had been planned for building new aircraft was subtracted from the previous appropriation.

The Italian aviation industry was one of the first in the world, before the war. The factories owned 41.7 million sq. ft. of covered space and employed 10,000 workers. At present, the covered area of the surviving factories amounts to 4.5 million sq. ft. which, it is estimated, could accommodate 35,000 operational workers, who could build 5,000 tons of material worth \$120 million.

When 1955 opened, it was realized that the labor force employed in the industry did not exceed 4,000 workers, mainly employed on all these under-making spare parts and modifying on-going of some types of American planes applied to NATO—and in building training aircraft of Italian design (10-17 planes of a kind), which the Italian aviation authorities now order only when forced to do so by the war, threatened with unemployment.

**NATO Uncertainty**  
The critical situation of the Italian aviation industry is made still more serious by the prevailing uncertainty in NATO's plans for a continuation of war to secure the commitment of the force.

Industry had hopes for the plan for the reinforcement of the airforce, agreed on by the several European countries, dealing both with the war of the effort

and a new horizon share of the industry. But the main trials by political events in Europe last year has increased the distrust of the engine manufacturers. Many have expressed the opinion that when these plans are at last drawn up, the Italian aviation industry will have ceased to exist.

#### Plane Production

The leading military-aircraft contract activity now awarded is by Fiat, in Turin, and Aeritalia, at Naples.

Fiat, besides building some models of the G-92 jet trainer, has won in the NATO competition opened between the countries of the European Community with its model of a light fighter, the Fiat G-91.

The work of assembling the North American F-86K Sabres began in early 1955. Delays have been caused by technical difficulties (the need of adapting the machinery and instruments to American standards) and to the political uncertainties, which have given the order.

Aeritalia has not yet completed the building of two models of a new plane ordered two years ago by the Italian Air Administration. The aircraft is a light fighter with arrow-shaped wings, the Sagittario II.

Aeritalia is still engaged in building parts of the F-84 bomber house.

#### Trainers, Tourists

The production of light training and tourist planes is still on a very small scale, owing to the almost total absence of government orders. Nevertheless some of these turned



**Last of the Yellow Perils**

Last biplane squadron still active in U. S. military service is made up of NAF-built N1M-4 trainers, first awarded for operations in the Korea War, ME. Used now in a biplane squadron from the newly U. S. Naval Academy, the N1M-4 is the Navy's last version of the Beech-Walker (Beech-Stinson) N1M series of trainers in which thousands of student pilots received primary flight training during World War II.

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**FIGURE** Testing airborne systems is the job of Air Arm's Flight Test Center. Here, eight former military pilots, men with aviation backgrounds which total over a century of flying experience, keep as many as 16 prop and jet aircraft on the go. They subject equipment in every possible airborne rig before it goes into operational aircraft. 119 highly trained and experienced Flight Test personnel—engineers, technicians, mechanics, avionics and aerologists are working hard to insure that pilot, aircraft and airborne system form a perfectly matched combination for peak efficiency and performance.

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JAN 64

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out have entered reliable technology and successful vacuum abroad.

• Paggio has entered into an agreement with the Royal Aircraft Corp., Nijmegen, for the supply of a two-engine amphibian, the P1361, which will be fitted to the U.S. with American engines and known as the Royal Gull. It is said that Paggio is now completing licensing arrangements permitting a German firm to build the Italian company's two-engine P149 for spot and limited services.

• Messie has granted a license to a German firm, Seibel, for building their touring two-engine plane M.B.303.

• Agusta works has completed its test series of Bell 47 helicopters for which the Italian concern has obtained exclusive European rights.

Important orders were received for these helicopters from France, Switzerland and the Scandinavian countries, it is reported. The same plant has plans for a civil twin-engine jet plane, testing 70-30 passengers.

• Nark is negotiating with American firms, among them Boeing, granting rights to produce landing gear and wing systems of their single-engine domestic flying wing amphibian, the N.335.

## Belgian Air Force Builds Seven Wings, Improves Supply of Pilots

**Brussels**—The Belgian Air Force is growing up.

There has been a notable improvement in the supply of pilots, though figures are not yet available. The last of the trainees sent to the United States went in the summer of 1959. Henceforth, Belgium can rely on her own sources.

Pilots go first to the elementary flying school at Gosselies. After two years they are sent for five months to the advanced school at Kanne in the Belgian Congo, where they fly North American F-6s. Kanne has completely replaced the former school located at Brüssel, Belgium.

After Kanne, pilots return to the fighter school at Courcelles, Belgium, where they are trained on Meteor 3 jets.

### Seven Wings

Belgium's Air Force maintains seven operational wings.

Three of them—Fint, Sersaif and Thierbach, based on Beerselvaux, Chaux and Reuten respectively—are interceptor wings working in cooperation with the Dutch.

Wings Two, Nine and Ten, based on Namur, Reuten and Klein Brogel, are tactical wings forming part of the Allied Tactical Air Force.

There are Belgian elements in Germany at NATO headquarters and at group headquarters at Wiesbaden (Colaport). Apart from there, Belgium does not maintain air force units in Germany, except that two squadrons of T-104 Wing are temporarily based at Cologne-Landau and Wuppertal-Barmen. Klein Brogel, in turn, and brought up to date. Wing headquarters at Klein Brogel is still maintained and new equipment is now able to use the new way—weather being temporarily helped at Reuten.

The tactical wings are still equipped

with F4G Thunderbolts. They expect very shortly to be replaced by P-547 Thunderbolt and RP-547 Thunderbolt photo reconnaissance aircraft.

The fighter wings have Meteor 3s and Meteor 11 night fighters. The Meteor 3s will eventually be replaced by Hawker Hunter.

Replacement of the Meteor 11 has been urged strongly, particularly since the unexplained failure of one of these last year last Belgium flew the night fighter pilot, Wing Commander Kanne. In view of the collaboration with the Dutch in interception work, it would be logical for the replacement unit to be the all-weather F-6G Solent. There are, however, three other candidates, the Javelin, the Vampire and the Mystere 4B.

### Air Force Manpower

Latter official statement of the strength of the Belgian Air Force shows—

• Officers 1,254.  
• Non-commissioned officers 4,177.  
• Other ranks 14,798.

The Belgian personnel (pilots and navigators) include 465 officers and 185 non-commissioned officers; the total staff personnel number 293 officers and 2,316 non-commissioned officers.

Personnel listed as other ranks are 1,808 corporals and sergeants who are permanent personnel, having made the Air Force their career. The remainder are conscripts serving for 15 months.

### Transport Wing

The last of Belgium's formations is the Fifteenth Wing, the transport wing, which makes constant shifts with the maintenance between Belgium and France.

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bined talents make possible Globemaster's lift of 58,000-lb. payload. Skyraider's record of 751.1 mph. Skywarrior's speed of 1,325 mph. new military hardware created by such jets as the A-1D, B-66 and A-1H, guided missiles like Nike and rockets like Honest John.

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**C-118A—R6D**



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*Biggest payload on transport. Eleven payload*

**Nike Rocket**



*Superior performance actually already in service*

**D-558-2 Skyrocket**



*First plane to fly double speed of sound*

**A-4D Skyhawk**



*Go into it from small carrier with 4 bomb*

**Honest John**



*Delivers its war or high explosive payload*

**A-3D Skywarrior**



*Star's biggest carrier based fighter*

**RB-66**



*Breaks the Four reconnaissance barrier*

**YC-124B**



*First military transport to use turbo-prop*

**X-3**



*As research plane, performance classified*

**F-3D Skyknight**



*Two jet, rather quiet night fighter*

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DC-4, for passenger work and Fairchild C-119 Packets for the carriage of stores. During 1954, it was owned 2,128 passengers to Kinross and 390 tons of stores.

It was created in 1947 but did not really become active until 1949, when it was equipped with DC-3s and C-47s. In March 1955, it will make its two hundredth sortie to the Congo from its base at Melunville, Benin.

The use of Spitfires by fighter squadrons was completely discontinued in 1947 August.

### Air Fields

The main infrastructure program has now been completed. Work is still continuing to repair early errors in laying the runways at Kinross-Bangui, and there is also work continuing in the Sudanese country on the building of diversion air fields.

There is also major work in progress at Gaoles, which is to become the main testing ground for British aircraft. Work in the Benin-Burkina Faso region is being extended to a full area of 25,000 sq. miles.

### Air Industry

Belgium is not a major aircraft spare parts country, but does supply

### Bristol Profits Climb

London-Bristol Aeroplane Co.'s net profit rose to £2,236,446 during 1954, climbing from the preceding year's £1,618,490. At the annual shareholders' meeting last week, Bristol also announced the resignation of Sir William G. Verdon Smith as chairman.

Sir Reginald Verdon Smith, son of Sir William, will succeed his father as the company's top executive—a post held in the former position for 27 years.

At Bristol made its report, the helicopter business started back previous years in line with regulations drawn up after the Hired Aircraft Commission investigation. The company's biggest profit in 1954 was completed last month.

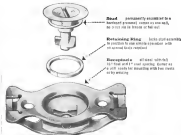
Sir William said of the firm: "The development phase has been an exciting one for all concerned, but the results promise to exceed our highest hopes. We can now say that our original confidence in the firm's management at the design stage has received continued confirmation at each successive stage of development."

Bristol's American Agency Corp. ordered 15 Mark 300 Britannias, eight Mark 300s and 10 long range versions of the Mark 100. It also placed a contract for three Mark 300LEs, plus an option on two more.

The British government ordered three long range Mark 290s to provide passenger capacity transport.

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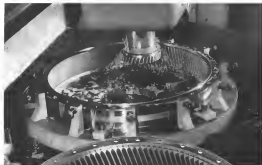


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## OF Aircraft Officials

Aircraft firms reported nominations to top officials as early as \$10,000 for the 1954 calendar year to the Senator and Exchange Commission in Illinois.

**Lockheed Aircraft Corp.** Robert Coon, president, \$128,223 (plus retirement contribution \$9,783). Coastland Coon, executive vice president, \$9,971. C. A. Baker, vice president, \$59,247 (plus retirement contribution \$15,975). Carl Chapin, vice president, \$68,513 (plus retirement contribution \$5,018). Bill Hibbard, vice president, \$68,605 (plus retirement contribution \$9,054). Edward Okada, vice president, \$45,765. Carl Sauer, vice president, \$68,182 (plus retirement contribution \$16,407). All directors and officers, \$791,279 (plus retirement contribution \$106,531).

**United Aircraft Corp.** H. M. Flower, president, \$181,773. Leonard Holbe, vice president, \$148,488. Ferdinand Reinhardt, board chairman, \$128,353. William Robinson, vice president, \$111,609. All officers and directors, \$1,845,529.

**North American Aviation** (year ended Sept. 30) James Knollinger, board chairman, \$170,000. J. E. Alwood, president, \$124,868. R. A. Lambeth, vice president, \$56,000. Raymond Raci, vice president, \$52,000. J. S. Smithson, \$55,000.

**Boeing Aircraft Corp.** Lawrence Bell, president, \$55,020 (plus retirement contribution \$16,535). William Kopas, executive vice president, \$63,075. Ray Weisner, vice president, \$59,375 (plus retirement contribution \$11,566). All officers and directors, \$441,914 (plus contributions for retirement funds of \$89,714).

**Spartan Corp.** Harry Vokes, president, \$184,630. Thomas Doe, director, \$66,765. Kenneth Housen, vice president, \$98,010. John Sanderson, senior vice president, \$112,870. All officers and directors, \$547,827.

**Franklin Engine and Airplane Corp.** Richard Burtch, president, \$127,068 (plus retirement contribution \$14,430). Arthur Flood, executive vice president, \$56,482 (plus retirement contribution \$14,315). Wilfred Landon, vice president, \$73,571 (plus retirement contribution \$8,078). All officers and directors, \$383,541.

**Cessna Aircraft Engineering Corp.** L. W. Greenman, board chairman, \$61,967. L. A. Swoboda, president, \$72,252. William Schneider, executive vice president, \$61,967. E. Clinton Towl, vice president, \$10,643. All officers and directors, \$499,678.

**Boech Aircraft Corp.** O. A. Boech, president, \$96,100. John Guty, vice

president, \$69,149. Frank Helrick, vice president, \$60,616. L. A. Wells, vice president (joined, Aug. 4) \$45,368. Immediate for all officers and directors, \$362,165.

**Cessna Aircraft Co.** (year ended Sept. 18) Thomas Waller, president, \$40,000. Thomas Selby, vice president, \$57,960 (plus retirement, vice president, \$42,000. All officers and directors, \$302,150.

**General Dynamics Corp.** nomination to Consolidated Value prior to merger in partnership John J. Hopkins, board chairman and president, \$146,705 (plus \$16,758). Paul J. Rice, executive vice president, \$58,521 (plus \$2,500).

Joseph McNamara, senior vice president, \$30,780 (plus \$16,750). J. Geoffrey Nat (son, senior vice president, \$28,000. Lawrence Richardson, senior vice president, \$43,112 (plus \$2,250). O. Pomeroy Robinson, senior vice president, \$47,154 (plus \$2,250). Lambert Goss, vice president, \$40,450 (plus \$2,250). Roger Harris, vice president \$18,793 (plus \$2,180). J. V. Nash, executive vice president of General Dynamics, \$30,500 (plus \$2,180). All officers and directors, \$390,099 (plus \$18,717).

**Boeing Airplane Co.** William Allen, president, \$107,515. Waldo Wood, Jr., senior vice president, \$77,246. Fred Landon, vice president, \$48,053. J. E.

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First flight of  
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Scholar, vice president, \$62,805; Ed word, vice president, \$62,860; J. O. Yurting, vice president, \$45,618; all officers and directors, \$40,470.

Ryan Aeronautical Co. (for year ended Dec. 31): C. C. Clark, vice president, \$18,500; (plus retirement contribution of \$3,835); C. C. Wendel, executive vice president, \$40,000; (plus retirement contribution of \$4,278); all officers and directors, \$30,175; (plus retirement contribution of \$18,945).

McDonnell Aircraft Corp. (for year ended June 30): James S. McDonnell, president, \$45,080; (plus retirement contribution of \$4,500); Robert Chasler, vice president, \$38,773; (plus retirement contribution of \$3,773); C. Warren Drake, vice president, \$35,476; (plus retirement contribution of \$3,345); Kenneth Perkins, vice president, \$31,524; (plus retirement contribution of \$3,131); all officers and directors, \$122,347; (plus retirement contribution of \$38,905).

Glenn L. Martin Co. George Benke, board chairman and president, \$740,000; J. Bradford Whitson, vice president, \$70,000; George T. Wiley, vice president, \$10,000; plus \$6,774 pension contribution; all officers and directors, \$144,750; plus \$14,043 in pension plan contributions.

Ryanair Aviation Corp. Mandy Peifer, president, \$105,000; Walter Rues, vice president, \$75,873; Alexander Kretsch, vice president, \$13,430; all other officers and directors, \$50,000.

## Los Angeles Planning New Airport Project

Three architectural and engineering companies are developing plans and designs for new terminal facilities at Los Angeles International Airport to take care of the city's increasing traffic.

Gen. Ralph P. Cousins, president of the Board of Airport Commissioners, was preliminary plans to finance the project call for approval of a general obligation bond issue in the November 1958 election. Last year, Los Angeles voters refused to approve a \$9 million bond issue to cover the cost of the airport's proposed new terminal building (AW Apr. 11, p. 22).

Of the new project, Gen. Cousins says: "This marks another major step in the development program to take care of the ever growing needs of International Airport, now the second busiest in the world. After intensive research and study to select architects and engineers for the terminal project, the Board of Airport Commissioners decided that the City of Los Angeles would best be served by the creation of the joint venture of architects and engineers for the all-important terminal development."

## DOUGLAS A4D SKYHAWK



**Reduces  
Weight and  
Miniature Saves Panel Space with new  
OXYGEN REGULATOR**



• This new Scott-Farwell miniature Oxygen Regulator system is doing a full-size job on the Douglas A4D "Skyhawk". The "Skyhawk" fulfills a need for lightweight fighter aircraft. This system helps solve gear problems caused by the need for miniaturization.

The regulator is attached to the pilot's standard oxygen mask. Resulting in a 100% saving of valuable panel space. The regulator itself weighs only 1 1/4 ounces as compared to 4 1/2 pounds of the standard regulator. A small 3/4 inch multi-base replaces the regulator, bulky breathing tube. These are only a part of the advantages of the new Scott miniature Oxygen Regulator System now available for military and commercial use.

Lighter components make lighter aircraft



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# LEWIS

## Standard Temperature Indicators for Aircraft

USED BY LEADING AIR LINES, THESE INDICATORS HAVE PROVEN THEIR RELIABILITY BY YEARS OF SATISFACTORY SERVICE.

### THERMOCOUPLE TYPE

All LEWIS thermocouple indicators are fully cold-end compensated, magnetically shielded and are available for use with iron-constantan, copper-constantan or chromel-constantan thermocouples in all standard ranges for the thermocouple material used. A few typical ranges are listed below.

**MODEL 175, 2½" case to ANS 10481**  
—80 to +380°C Cylinder Temp.  
(AN 5834-1A or TIAJ)  
—35 to +200°C Blewing Temp.  
0 to +1600°C Exhaust Temp.

**MODEL 416, 1½" case to ANS 10482**  
—80 to +306°C Cylinder Temp.  
0 to +1000°C Exhaust Temp.

**MODEL 770 dual, 3½" case to ANS 10483**  
—80 to +325°C Cylinder Temp.  
(AN 5834-1A or TIAJ)  
—30 to 306°C Blewing Temp.  
0 to +1000°C Exhaust Temp.



MODEL 175



MODEL 416



MODEL 770

### RESISTANCE TYPE

Accurate resistometers, these LEWIS indicators are remarkably free of voltage error, have easily visible scales (not crowded at the ends) and are magnetically shielded. A few typical ranges are given below. Not shown is Model 446, 2½" scale.

**MODEL 416, 1½" case to ANS 10482**  
—80 to +150°C AN 5796-4 or AN 5797N  
0 to +120°C Oil Temp.  
—80 to +90°C Air Temp.

**MODEL 771 dual, 2½" case to ANS 10483**  
—80 to +150°C AN 5796-4 or AN 5797N  
+30 to +210°F Oil Temp.  
+100 to +380°C Cylinder Temp.



MODEL 416



MODEL 771

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Manufacturers of Complete Temperature Measuring Systems for Aircraft



## New Transit Saves On B-52 Tooling

Development of an optical transit square and a specially designed tooling bar for use in erecting B-52 Stereo-kutans may amountably save are expected to save Boeing Airplane Co. Wichita, nearly a quarter-million dollars.

The new technique offers important savings.

- Accurate basic reference lines can be established in less time.
- Set up times are reduced.
- Multiple crew loadings are possible.
- Need for many master tools is said to be diminished and simplification of gauges is possible.

Optical transit square was developed by Boeing tool designers. The company pooled this information with that compiled by Ford Motor Co.'s Kansas City (Mo.) control plant, saving about six months in getting the system into operation. Made by Precision Instrument Co., Kansas City, it is said to be extension of the conventional gage transit application.

The new transit square has a hollow case, one end of which is enclosed by a clear window tool the other by a partially mirrored window that can be seen through or used for purposes of reflection.

Three up to four units can be used on a single tooling bar, allowing four crews to work at once. The tooling bar has close tolerance holes drilled every 10 in. along the working surface, permitting a mobile carriage to be quickly repositioned for measuring the transit square along the tooling bar.

In addition to the eight-ft B-52 which is also being built at Seattle Boeing's Wichita plant are producing B-70F Strato-bombers and B-47E photo reconnaissance aircraft for USAF.



## Bendix International in Aviation

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Bendix weather instruments provide the vital data for flight plans. Bendix filters guard the fuel used by engines equipped with Bendix systems. Bendix controls, gauges, warning and fuel systems. Bendix automatic pilots, instruments, radar, scanning mechanisms, and other scientific devices surround planes with safety and guide them to port.

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These weather items prepared in consultation with the United States Weather Bureau

## FRONTS..

These boundary edges of air masses produce much of the weather affecting flight.

**F**ronts may mean hundreds of miles and cannot be avoided by local course changes, nor can they be topped at altitudes attainable by many planes. By understanding the principal features of fronts, however, it is possible to recognize them and make adjustments to the flight plan accordingly.

Here are the basic characteristics:

**COLD FRONTS**—the advancing edge of a cold air mass. Show any type of rain or snow, thunderstorms—Cumulus type clouds—Sudden wind shift due the storm, usually to W, NW or S—Drop in temperature after wind shift. Clouding weather sometimes slow.

**WARM FRONT**—retreating edge of a cold air mass caused by warm air. Usually precipitation—most showery—disrupted cloud layers—Gradual wind shift to S, SW or W—Rise in temperature and humidity—Temporary clearing.

**OCCCLUDED FRONT**—The upper front resulting from collision of cold fronts and warm fronts. Line recognized on weather chart but where events indicate a mixture of cold front and warm front characteristics, it is likely an occlusion has taken place.



Cross-sectional view through typical cold and warm fronts

## Best Pair to Get You There!

The more you know about the weather, the greater your chance of producing top performance. The more is true of the products that power and protect your engine.

Pilots who use Mobilgas Aircraft and Mobiloil Aero know they meet rigorous Army and Navy specifications...also they've been first choice of air power—Lindbergh, Eaker, Byrd and many others. It's safe to predict that with these products in your plane your engine will run smoother, perform better than ever. Fly safely. Fly with the Flying Red Horse!



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MOBIL OIL CO., INC., GENERAL PETROLEUM CORP.

## AVIONICS

### New Lightplane Tacan Weighs Under 25 Lb., Costs \$2,000

A new element has appeared in the Tacan vs. DME controversy, with the announcement by IIT's Federal Telecommunications Laboratories of a new, simplified, personal plane Tacan receiver (AW May 13, p. 108).

F. C. Sandretto, technical director of FTL, says the new set will perhaps be one bit the functions of distance and bearing analogues plus true position bearing. Cost will be \$2,000.

Bearing accuracy will be equivalent to current VOR portable phase equipment. Sandretto, says, distance accuracy will be about one half mile or 3%, whichever is greater. FTL officials say such low type distance accuracy will soon be built into the ground plane sets. Two range equipment will be flight-tested in July, with production scheduled for October.

The set will contain fewer than 40 tubes, weigh about 25 lb., and measure 6 1/2 x 14 x 6 in.

One big advantage of the portable Tacan, as Sandretto says it, is the substituted reduction in vacuum tubes and elimination of all but a single antenna on the outside of the plane.

Getting the number of tubes greatly reduces the set's reliability, Sandretto says.

He doing this compares to putting up the relation between equipment as follows and number of tubes used:

• Conventional position—accepts VOR, DME, bearing, distance and glide path, and uses 157 tubes and probably four antenna—one each for DME, and bearing, distance and VOR glidepath, and marker antenna. Peak shifts of tubes in a 10-hr. mission is 18%.

• Coordinated Tacan system, when providing the same services as the conventional system, uses only 75 tubes. Peak shifts of tubes drops to 25%.

If the 157 tubes of the conventional system were reduced with Tacan, two 10-hr. missions could be provided, one

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of them a smaller, Sandretto says. This would show the probability of usual vacuum failure down to 8%.

Sandretto quotes these additional figures to show implication of saving number of tubes to a minimum based on a 10-hr. mission, with 750 tubes, the failure rate is substituted as 8% with 750 tubes, 65%. Even if "half-sized" tubes are used, failure rate with 350 tubes drops only to 48%.

Many advantages of the single antenna are reduction in weight and drag, and simplified installation. The antenna is a pole type, 6 in. long and 1 in. in diameter.

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## New Foam System Guards Eglin Hangar

A new type of hangar fire protection system which combines water deluge sprinkling with Arfoam has been developed and successfully tested at USAF's Air Proving Ground Command, Eglin AFB, Fla.

The hangar in which the system is installed measures 393 x 500 ft. Height ranges from 55 to 104 ft., at the top of the main.

The building poses a big fire protection problem, because it could house two 18 ft. or smaller jet aircraft, with more than 50,000 gal. of gasoline in these fuel tanks.

This quantity would be sufficient to flood the entire floor area with a pool of aviation fuel half an inch thick.

### How It Works

Special problem in protecting this hangar and aircraft, contained within conventional buildings, is that the contents of the hangar can be more than the value of the building itself.

The foam-water sprinkling system is triggered into action when temperature rise rate in the hangar indicates the start of a fire. This opens the water deluge valves. As water flows into the sprinkler system it trips combination deluge valves positioned in the foam liquid line.

Water and foam liquid are mixed at the sprinkler valves. The combined mixture passes through fans which give it a swirling motion. As the solution is discharged through sprayer outlets, air is then entrained to produce the Arfoam.

Nearest pumps push the mix down from water level through 12 separate sprayer nozzles which create up the overall fire extinguishing system. Arfoam is discharged through 1,152 nozzles heads to fill the entire hangar with the extinguishing agent. The Arfoam blanket first flows over the hangar's steel superstructure, then drops to the floor to form a nonconductive fire-retardant blanket.

Arfoam discharge can be initiated manually. The system also may be operated automatically as a standard deluge sprayer system discharging water only, or foam only can be discharged.

Equipment used includes three 4,500-gal fire pumps which draw water from a 600,000-gal water reservoir, a 10,000-gal foam liquid storage tank supplying a 750-gpm centrifugal foam pump, two 18,000-gal reserve foam storage tanks.



CARPET OF FOAM covers first of 16 Air Proving Ground Command special hangar at Eglin after test of new protective system. Foam was later flushed away with water.

### Airfoam Benefits

Aeromatic Sprinkler Corp. of America, Youngstown, Ohio, manufacturer of the system, lists three benefits:

- Arfoam can flow along the floor and then outspread fans under aircraft wings and engines.
- Arfoam will extinguish the surface fires of gasoline pools burning on a larger floor and also nonburning fuel to flow under the Arfoam blanket to douse.

• Fuel spillage and associated localized sources of flash fires can be avoided because one of the 12 individual sprayer nozzles may be manually operated to discharge foam only. The 20-in. diameter foam blanket will trail out any, incipient fire and allow an aircraft to be towed out of the hangar with minimum risk.

Cleaning, defueling out of hangar is simple. The system is set to discharge water only, flushing the protective foam blanket down the floor drains.

## Bearings Face Tough Jet Tests

Full bearing rotational speeds in today's jet engines range from 5,000 to 10,000 rpm for the 150 to 175 mm bore size, representing a minimum at least three times as severe as those encountered by conventional bearings. In combination with very high loading conditions, this means that conventional ball bearings cannot do the required job, says Elmer Hefner, aircraft project engineer with New Direction Division of General Motors Corp., New Berlin, Conn.

Military aviation bearings must also operate for a limited time with little or no lubrication (to allow the plane time to land if lubrication fails) or in battle-damaged, sustained tank temperatures of over 500° when engines shut down and be highly reliable. To meet such requirements bearings will

have to be made of tool steel, Hefner says.

Jet engine bearing applications are tougher than shaft bearings which support the compressor and turbine assemblies and accessories gear drive ray post bearings.

To give the main shaft bearings the greatest possible capacity, split axial ring designs are used. Higher thrust shoulder balls of the largest possible diameter and one piece machined rings all contribute to high bearing reliability and longevity.

If heavy thrust loads exceed the design capacity of such a bearing, two accurately matched units can be used to reduce the load per bearing.

Although accessory gear drive bearings operate at temperature and speeds only slightly above those found in

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A specially designed and shock-mounted Sanborn 2 channel recorder provides dynamic strain measurements on a field harrow harvesting machine, during actual field use. In the photograph, motor shaft torque and RPM are being recorded, one of several tests conducted. Harvesters have found the Sanborn System in field testing their harvesting equipment.

### AT ARMO GEAR WORKS, QUINCY, MASS. ...

A record of tooth irregularity of various types of precision gears is obtained on a single channel Sanborn Model 140 System, used in conjunction with a special gear checking instrument designed by Armo Gear Works. The equipment provides a visual spot checking of gears, helps maintain a high rate of acceptability and provides a permanent record of tests often required by customers.

### AT G. E.'S AIRCRAFT GAS TURBINE DIV. ...

Engine record performance data such as temperature, pressure, RPM and timing flow of jet engine starters, using a modified Sanborn Model 47 System for demands of laboratories are recorded in this five-channel unit, equipped with three DC amplifiers, one bridge, a five channel DC generator, two channel tape suppression network and two channel drive gear amplifier. The data also provides G. E. engineers with an indication of the performance of all production units.



Time to find applications subject the scope of capabilities of standard and modified Sanborn Recording Systems. Maximum accuracy, permanent, graphic registration of dynamic phenomena in the 0-1000 rpm range is required, the versatility and flexibility of Sanborn units, two, four, six and eight channel systems will prove invaluable. A wide variety of readily interchangeable, plug-in accessories enable our basic system to meet every recording requirement. Standard equipment features multiple address recording in true synchronous record mode, high torque galvanometer movement, time and scale marking and a choice of nine chart speeds.



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average applications, the high-precision requirements results in using bearings to AEC-5 tolerances and of specially machined, lead riding cages of high-strength materials, according to Walter New Department is engaged in an intensive research program to develop bearings capable of giving reliable service in the high-speed regions now being designed.



### Panel Checks Cameras

High degree of skill is not needed to operate new test rig that quickly locates malfunctioning parts and corrects or warns operator.

Camera is plugged into the test board and the operator dials three camera-a set for each camera model—on a telephone-type dial. The standard camera in the panel so that standard results follow from tests carried out by the operator.  
Gordon Interphase, N. Hollywood, Calif.



### Tape Collar for Props

New "radio-actinometer" tape collar for flow-rate studies suitable-type propeller blade checks is used to prevent erosion and prevent supplies, free-flowing surface for a rubber seal to seal up. It is also claimed to eliminate oil leakage and leakage into of the seal. The tape, called "Propeller 491", consists of two Post-Tension loaded to aluminum foil and coated with a heat-resistant adhesive. Miller, John M. Co., North Haven, Conn., was awarded the patent for the type in question, and was also awarded for conducting server tests.

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- Operates under ambient temperatures in 50° F.
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- Has a precision adjustable life plunger stroke.
- Is designed for maximum duty operation under constant 1500 psi fluid pressure in the plunger cavity.
- Operates on 28 Volts D.C.
- Is equipped with a built-in pilot line solenoid to do the same precision job.

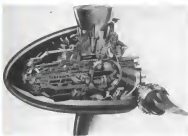
The important point for you is that PSP engineers and engineering will build the solenoids to meet the toughest problems of today's aircraft—and tomorrow's. We can help you with your solenoid requirements too!

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BLADE PITCH CONTROL of the Rotol prop installation is shown in position view.

## Details of Viscount's Rotol Props

The Rotol before-powered propeller installed in Viscount Viscount aircraft will be seen with increasing frequency in this country as Capital Airlines' fleet of turboprop transport goes into operation.

In addition, United States Steel has recently ordered three of the ships, and other expansion of executive aircraft are reported ready to follow suit.

To date, the Rotol installation has logged over a quarter of a million flying hours in two years of service airline operation.

The following story details the operation and safety features that apply to Rotol's propeller in the Roth-Royce Dart 510 turboprop engine on Capital's Viscounts.

There are no cockpit prop controls for normal operation—the blade pitch change mechanism is coupled with the engine throttle for simplification for the pilot. Preflighting features are available for emergency use. Props convert automatically in these situations: if an engine fails during takeoff or initial climb.

During takeoff, as throttles are advanced, prop blades automatically and rapidly change pitch to absorb increasing engine power. Even if throttles are advanced again, prop-over-speed does not exceed 150,000 rpm, says Rotol, and the condition is corrected in one beat.

At cruise, in all other conditions, as automatic prop synchronization system holds the four sets of blades to within a quarter of a revolution.

Electrical detent is provided for the prop blades, spinner and engine air intake. Co-pilot has a two-position switch which allows him to take care

of unusual or severe icing conditions. Four switches supply detent to each prop spinner and intake individually.

Propeller control at landing also is automatic; the blades returning to fine pitch as power is reduced. On final approach, throttles of the Viscount are closed at approximately 100 ft. of altitude and 135 mph airspeed. At this point, prop blades are at light fine pitch, or 25 deg. As soon as the plane lands and its weight compresses the landing gear struts, microswitches allow blades to swing to the ground fine pitch range—4 to 8 deg. "This occurs at an airspeed speed of about 70-75 kts with the propeller blades providing smooth but appreciable deceleration."

### Prop Details

The propeller pitch change mechanism automatically a single effective look at the takeoff fine pitch setting of 34 deg. The stop can be "locked-off" to allow blades to swing to maximum 8-1/2 deg. pitch to reduce prop drag to a minimum during engine starting, for ground operation and deceleration.

Electrical circuit energizing this stop provides double fault protection. The stop is usable only when the plane is on the ground. Rotol has no intent of this stop has ever been required.

Nevertheless, at the request of the Civil Aeronautics Administration, Rotol has installed an emergency stop at 21 deg., three degrees below the normal fine pitch stop. The new stop notifies the pilot that the blades have swung below the 24-deg stop, by turning on a warning light in the cockpit. It also energizes the propeller's blade-com-

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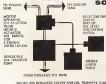
### PROBLEM:

To eliminate intricate wiring and relay contacts formerly required to scavenge oil transfer lines automatically.

### SOLUTION:

The Bendix-Pacific Oil Transfer Timer. Provides complete, foolproof operation automatically. Performs these functions:

1. Pump starts only when valve is in position.
2. Valve locked until cycle completed and line interrupted.
3. Pump instantly reverses when oil is no longer required.
4. Pump shuts off automatically after preset period.
5. Valve returned to neutral.
6. Timer shuts off.



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ing aircraft. This step like the one at 24 deg. automatically becomes smaller once when the aircraft is in the ground and very fine prop pitch angles are required.

Automatic prop centering takes place instantaneously in the event of engine or prop control failure during high engine power output. Synchro is controlled by the engine torque-sensor, which initiates the centering action of a preselected "no torque" condition. As soon as the engine produces torque again, synchro returns the propeller to normal operation.

Props may be feathered manually in dependency of the automatic centering action. To do this, the fuel cock lever is turned off, mechanically setting the prop control unit in the full coarse pitch position. Then the feathering button is pushed to start an independent electric feathering motor and prop.

Electric resistance heating elements are bonded to the blade leading edges to make a clean installation which will not interfere with aerodynamic efficiency of the propeller. Special heating element is attached to the inside of the spinner shaft. Power requirements of propeller (3.3 kw) and spinner (2.7 kw) heating elements are supplied by a 208 v., 3-phase, 400-cycle alternator. Each set of propeller and spinner de-

vices is cycled alternately with an intake heater at its engine.

Prop blades come from the spinner with an axial instead of a radial seal line, resulting in improved aerodynamic efficiency. Light, stainless steel covers the blade leading edges to resist erosion and corrosion.

### Maintenance

Props can be inserted or removed from the engine shaft without detaching the pitch change mechanism.

Conversely, the pitch change mechanism can be installed or removed at a complete mechanism.

Blades can be removed without detaching the pitch change mechanism, which simplifies transporting the propeller.

A propeller change can be accomplished in 20 minutes.

Overhaul periods are propeller and spinner gear box—1,250 hr. feathering pump—1,200 hr. total control unit—1,150 hr.



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Radio-telemotor TM 1397, designed for guided missiles and other missile applications, is guaranteed for 100 hr. operation in 175°C and 1,000 lb. at 75°C. Dual it and to respond instantly to excitation at —05C.

Theoretical acceleration is 12,000 rad/sec<sup>2</sup> and stopped torque 0.02 in. oz. with an external inertia loading that increases 0.018 in. oz. x 1.5 in. long and weighs 2.56 oz. No-load speed is 7,000 rpm, stall torque 0.30 in. oz. and total rotor inertia 1.8 gram-cm. Input power is three watts per phase and output current with motor supplied is 175 ma. Servo motor is, citation is 36 v., 400-cycle, two-phase and brake citation is 27 v. d.c.

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*Technical Bulletin are available on most of the devices mentioned.*



Pressure  
Transmitter



## New Testing and Measuring Devices

These new electronic devices for testing and measuring have recently been announced by Galileo Mfg. Co. Details and applications of the new products:

• **Glennco P490** dynamic pressure transducer is designed for general laboratory use to measure windage, thrust, transient pressure variations. The output recommends its use with its Glennco cathode follower Models P493, P495A and P497A. Cylindrical stainless steel is available in sizes 1/8" to 1 1/2" in diameter at one end and a venting or seal connection at the other end. It also employs a highly sensitive piezoelectric ceramic transducer.

Open circuit sensitivity is said to be 100 mv./psi., natural frequency 105 kc., pressure range: 0.005 to 500 psi., frequency range: 25,000,000 cps., and temperature range: -49C to 50C.

• **Glennco ultrasonic gauges** are available in two models, L.U. 100 with frequency response from 100 kc. to 2 mc., L.U. 101 responding from 100 kc. to 3 mc. In the 100 kc. to 500 kc. range the instruments accurately measure ultrasonic reflections, beyond 500 kc. they can be used at distances.

• **Glennco piezoelectric high-frequency vibrator AT-384**, handles vibrational measurement testing of electronic tubes and enables technicians to evaluate acceleration. Fundamental resonance frequency at 27 kc. and voltage is resistant to that point. Staff electromechanical design permits handling stresses up to 3 in. Resonance is reported to be 2.5 microinches per g's, output and accuracy range up to 0.50 at 1 kc. and 0.50 at 18 kc.

Address: Galileo Manufacturing Corp., Metuchen, N. J.

## OFF THE LINE

United Air Lines is testing a lighted runway aircraft lighting system similar to the one tried out by Transwestern Air Lines last year (AW, June 19, 1954, p. 56). Called "Madras light" (after pilot instructor Capt. Andrew Madras), the system is installed on a coach DC-6 and uses seven stroboscopic lights, oriented on top and bottom of fuselage. Bright lights flash 60 times a minute from 360 forward to show pilot's direction of flight.

KLM has come up with a new trick that adds 5 mph to the speed of the airline's Super Constellation. Foam plastic felt is applied to propeller trailing edges, forming the wind shape at the hub. This save for the glows more effective cooling of the power plants.



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FLOATS

Schneider goes the Boeing B-150 under development. It is a four-engine, high-wing, amphibious transport aircraft. The B-150 is a four-engine, high-wing, amphibious transport aircraft. The B-150 is a four-engine, high-wing, amphibious transport aircraft.

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Business Flying

Vickers Organizes U.S. Firm To Handle Executive Viscounts

Vickers Armstrongs, Ltd., has scored an important breakthrough in the U.S. corporate plane market and now has orders for more than a half-dozen executive versions of its turbo-prop-powered Viscount 700D.

U.S. Steel Corp. was the first to announce that it is getting Viscounts, with three scheduled for delivery next year (AW May 31, p. 95).

Vickers Armstrongs' spokesman in the U.S. says that there are several to signify regarding additional contracts, but indicates are that some will be announced soon. One of these is another multiple order, probably two airplanes, American West is told.

In preparation for what it calls "considerable interest" from the corporate market for an Executive Viscount, the airplane builder has formed a new company in the U.S., Vickers-Armstrongs, Inc., which will provide technical alternatives service and sell spare parts in the U.S. The new company is capitalized at \$200,000, comprising 200,000 shares of common stock, all of it held by the parent firm.

Vickers-Armstrongs' headquarters in Alexandria, Va., established to handle Viscount agents for Capital Airlines, will fill sales' positions of the new company. Future plans include establishment of sub-depots in the U.S. where they are needed due to extension of Viscount operations. Indications are that Vickers will maintain a close grip on spare and does not plan to appoint distributors.

The new U.S. company's board includes T. Roy Jones, president of Dryden, Inc.; John T. Sanders, board chairman and president of U.S. Industries, Inc.; George R. Edwards, managing director, Vickers-Armstrongs, Ltd.; Ronald P. H. Yong, a V.A. director, and Christopher Clarkson, the airplane builder's U.S. representative since 1952. Vickers-Armstrongs, Inc., will maintain technical offices at 1523 L St., N.W., Washington, D.C.

Richard Rottford has been appointed as the organization's chief technical representative.

Clarkson has been leasing the U.S. showing potential customers brochures detailing the Executive Viscount's features. Prospects are offered a "base bill" consisting of a standard Capital Airlines' engine with Bendis autopilot and Collins radio, long range, "slipper" tanks on the leading edges of the wings and auxiliary fuel tanks in the belly in the present position of the fuselage. Basic price for this configuration is approximately \$924,000, plus 15% airport duty. However, equipment can specify any cockpit layout or other equipment, with price then varying depending on their choice.

Planes can be delivered in 26 months, if orders are placed now, Vickers spokesman says. The line trail will be open to the U.S. for installation of extension by American corporate specialists to the customer's specs. This procedure saves the buyer 15% airport duties on this phase of the airplane.

Addition of leading edge and belly tanks will give the Executive Viscount an alternate and/or range in standard air conditions of 2,875 statute miles, allowing climb to cruise at 25,000 ft. This is some 400 miles greater than standard unless Viscount 700Ds without belly tanks.

The plane's main wing tanks will hold 2,250 U.S. gal., slipper tanks 345 gal., and belly tanks 580 gal. At this fuel load, gross takeoff weight will be 65,000 lb., with disposable load 33,400 lb.

Powerplants are Rolls-Royce Dart Mk. 520s rated at 1,550 takeoff shaft horsepower each, plus 360 lb. of residual thrust.

The company points out that the engine is capable of taking into, even powerful versions of the Dart, with only minor modifications. Cruise speed with Mk. 520s will be approximately 330 mph.

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**MICRO SWITCH** provides a complete line of extremely reliable, small size, high capacity, snap-action switches and mounting hardware. Available in a wide variety of sizes, electrical ratings, and electrical and mechanical characteristics. For all types of electrical controls.





## Solar research boosts altitude power output of gas turbine generator sets

FLYING ELECTRONIC TEST-BEDS need plenty of power in flight. So Solar "Mini" gas turbine auxiliary power units have been ordered for the Cessna C-441B. Two APU's, each hung in a pod, will be installed on each plane.

With the Solar units, an ample and versatile supply of electricity is assured. The easily demountable gas turbine driven generator can both be direct current units, or both alternating current, or one of each can be installed. As much as 30 lbs d-c, or 40 lbs a-c, can be supplied at 25,000 feet. This high power output results from major design improvements in the proven Mini engine.

Mini gas turbine APU's are already specified equipment on the Douglas C-230C and the Lockheed C-119C. They

have demonstrated their reliability and trouble free service life by logging thousands of hours with only routine maintenance. Recently these Solar units were operated from 5000 hours to 7500 hours between overhauls.

Light, compact Mini APU's can solve your airborne power needs. Write to Solar today for more information about these remarkable gas turbine generators!

**SOLAR**  
AIRCRAFT COMPANY  
ONE BECK  
AVE. WILSON, CA

ENGINEER'S WARNING: The use of solar panels in the aircraft is the responsibility of the user. Solar is not responsible for the use of solar panels in the aircraft.

## This is What Solar Offers You

When Solar, considered as difficult as it is, offers you a solution to your problem, you will find that Solar is the only company in the world that can provide you with a complete solution to your problem. Solar is the only company in the world that can provide you with a complete solution to your problem.



### SPECIAL FEATURES

But Solar's Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem. Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem. Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem.

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### CONTRACT PRODUCTION

Contract production facilities are available for the production of Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem. Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem.



Plasma Jet Solar (photo) shows the Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem. Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem.

Solar's Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem. Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem.

Solar's Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem. Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem.

### INFORMATION

For more information, contact Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem. Solar "Mini" 20 hp engine for auxiliary power units, you can get a complete solution to your problem.

## • BUSINESS FLYING Bell 47 Hand-Crank Allows Higher Payload

Bell Aircraft Corp. has developed a hand-crank starter for its Model 47 copters to permit operators to take out more than 80 lb of electrical accessories when greater payloads are required. The device will also permit a motor emergency start in case of a power shortage when auxiliary sources are not available.

The Ft. Worth, Tex., helicopter manufacturer is including the hand crank as additional standard equipment on all Lycoming-powered Bells delivered after July.

Hand cranking the Lycoming is done by means of the observed one and gear drive with a 2.5:1 ratio with the crankshaft. A special adapter is fitted in the drive splines, which has two notches to increase the hand crank.

When an increase in payload is needed, the operator can remove the battery, starter, 10 amp generator, volt age regulator, overload and attachments for a net saving of 80 lb. A single lightweight dry cell is then inserted to operate the starter.

The starter was developed by the company following vibration reports from agricultural, logging, construction and other users indicating that excessive shock loads at desirable to have an emergency starting system. Experience during the Korean War also showed that engine starts sometimes had to be made in the field using borrowed power from ground vehicles.

## PRIVATE LINES

Delicate whetstone loading was made at Wicksdale County Airport, N. Y., by Cessna 180 fitted with new Edo amphibious floats as part of tests required by Civil Aeronautics Administration for float approval. Float was then put into use, which lowered it to a normal takeoff and landing was made. Edo is working on an initial production run of 10 sets of the new floats at Col lege Point, L. I., N. Y.

Top speed of 124 mph, and maximum speed of 41 mph, has been recorded for the new AG-31 spray/dust plane only a three-mile course, reports designer Rod E. Wood, Director of Technical Aeronautics Research, Coast, Texas A&M, College Station. Distance to takeoff and climb to 70 ft. with 800 lb. in the upper end and lower end fuel from sea level with no wind, is reported as 620 ft.

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OR HYDRAULIC  
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CRASH PROGRAM



## Where can a Parker Team help you?



When Lockheed Aircraft engineers called Parker, they wanted action: Lockheed had designed a new hydraulic system to give more positive control over the power operated elevator trim tab on the F2V Neptune. As a result of the new design they had a requirement for a 4-port valve which was not available from any supplier.

In 18 days of intensive, day and night application and working so closely with Lockheed they were practically an extension of the Lockheed Engineering Staff, a Parker team from the Hydraulic Division delivered the first valve. In this short time they had designed the new valve with a new solenoid, made controls, and started production. The system was installed in an aircraft and found to be satisfactory that it was subsequently installed in earlier F2V models as well as current production.

The new system employs two valves per plane. They are direct solenoid operated, non interlock type, with a normal operating pressure of 3000 PSI. Internal leakage is low: maximum in any position still the maximum pres-

sure drop is 100 PSI at 4 GPM at 100° F. Actuating time to compressed position is 0.1 seconds maximum and to normal position is 0.5 seconds maximum. The solenoid is continuous duty type with a maximum current drain of 1.5 amperes.

The Parker team method of intensive application is available to you for all problems involving aircraft fuel valves, hydraulic valves, check valves and related components. If you have a problem in one of these fields or are beginning system design, get a Parker team on your side.

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## NEW AVIATION PRODUCTS



**SNAP-ACTION SPRING** unit (left) with adjustable screw fits into box containing counter.

### G-Counter Helps Predict Fatigue Failure

A statistical accelerometer, designed to help forecast engine failure, is being manufactured by the Uranus Division, W. L. Maxson Corp. Development was carried out by Uranus in cooperation with the National Bureau of Standards and United Bureau of Aeronautics sponsorship.

If the number of times an aircraft structure is subjected to a known, cyclic load stress of G stress can be accurately determined, the fatigue failure of the structure can be forecast, according to Miner's theory of cumulative damage. The statistical accelerometer tells the researcher how many times a particular G stress has been applied.

The instrument incorporates two, 4-gpm, electrohydraulic counters, which may be adjusted to register any desired G value from 2 to 10. Counters are actuated by Uranus snap-action spring elements which contain an adjust-

able mass mounted on a leaf spring. Each is put in to register desired G value on a horizontal centrifuge.

Electrical circuitry of the accelerometer allows the user to record only significant G, and ignore small excursions of acceleration. Data counter records the number of times the switch is set to record. A balanced rotary armature prevents movement due to shock, vibration or acceleration.

The accelerometer requires no power, fits in other operating supplies. Its record is clearly visible and it requires neither processing nor data reduction. The instrument was designed for low maintenance, high reliability and high fidelity recording of all systems and test loads.

It operates on 28 v.d.c. and counters draw 100 milliamperes each. Size of the unit is 5 1/2 x 3 1/2 x 2 1/2 in.

### Punch Press for Wiring Beards

Pierced wiring beards can be placed at nominal rates of 10 to 150 holes per minute using new RA-100 punch press. Holes up to 11 in. diameter are punched.

In operation the press tips into material when the hole locator is depressed so that it is engaged in a template hole. Engaging a foot switch engages the foot coil-actuated tool into place. Thermomatically controlled heating element in the table maintains desired punch temperature on preheated insulating blocks, the solder wires.

Worcestershire Machine Co., 4271 Winkelman Ave., Dept. 28, Philadelphia 25, Pa.

### Label for Electronic Gases

Electronic chain panel label ZIL not only provides leverage to open an

electronic door, but the handle also can be used for carrying the area, the maker says. Six pound maximum load dissipates the handle lock. Maximum horizontal swinging load is 400 lb., at transfer load is 600 lb.

Locking mechanism is designed to give a vibration proof seal when closed. Labels may accommodate a maximum panel size of 4 in.

Cumtek Products Corp., 55 Spring Valley Rd., Passaic, N. J.

### Liquid Sensor for Fuel Systems

Liquid-sensing unit detects presence of liquid in 0.4 sec. and absence of liquid in 5 sec., and has applications in fuel systems as a low level warning indicator or as a high level cutoff switch when tanks are being filled. A sensor is being developed that will operate in fuming nitric acid, the manufacturer reports.

An electrically powered probe containing a small thermostat, a compact power control package and an interconnecting cable make up the unit. Multiple probe types are available for improving automatic operations.

Unit is stated to be operable from -150 to +200°, has no moving parts and is not subject to wear, clogging, corrosion, vibration or shock.

Air Associates, Inc., Titusville, N. J.

### Long Parts Heat-Treated

Specs designed by Loftis Engineering Co. to virtually heat-treat existing parts, Vertical 752 furnace has been certified by U. S. Air Force for hardening, annealing, stress relieving and normalizing steel and aluminum, the manufacturer reports.

Unit is compact and moves on tracks over a 25-ft deep steel 60 lb./sq. ft. base, has three agitator-type capacity loads containing water, oil or hot salt. It has been found that the hot salt quench reduces distortion up to 90% compared with conventional oil quench, the maker states.

Furnace working space is 9 1/2 ft wide and 22 ft high. A full contained zone is a gas-tight housing. Metallurgical, Inc., Minneapolis 14, Minn.



### Small Circuit Breakers

Miniature trip-free Kheron D6781 circuit circuit breaker has 1/2 in. trip rate capacity and has handled over 2,000 amp., 120 v., 400 cps a.c., and 6,000 amp., 10 v.d.c. The manufacturer states. Breaker is designed to meet operational requirements of MIL-C-5049.

Two of these units can fit into the same mounting space as one NIS type breaker, it is reported. Breaker is available in ratings from 5 to 15 amp.

Spencer Thermal Division, Merish & Cumtek Corp., Arlington, Mass.

### Airlock Test Chamber

Thermotest test chamber for electronic equipment has a range of -150° to 200° and automatically cycles tem-

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pressure from -40°F to 150°F in 15 min.

Some units can be adapted to cycle temperatures in accordance with all government specs, the manufacturer says. Tantalum chamber dimensions 12x12x12 in.

Welcher Manufacturing Co., Inc., Dept. 3a, 2470 Madison Ave., Indianapolis, Ind.

## ALSO ON THE MARKET

Magnetic tape to transport frozen pieces up to 90 deg or less, also automatically stack flat parts and feed machines, the manufacturer says — Brown Manufacturing Co., Inc., Dept. 262, Lima, Ohio.

Self soldering flux kit contains 16 strands for ground current, electronics and general purposes. Price \$6.50 — Alpha Metals, Inc., 56 Water St., Jersey City 4, N.J.

Improved Tazco-Bob, for cleaning electrical equipment, has a flash point over 280 F, TCC, Dries without residues — Tazco Products, Inc., 6115 S. Central Ave., Los Angeles 1, Calif.

Sulfonate metal plating process gives coating hardness up to 50 Rockwell C and tensile strength to 600,000 psi, the maker claims — Barratt Chemical Products Co., Shelton, Conn.

Large metal coating preserves chemically clean carbon surfaces after electrolytic or chemical cleaning. Product has withstood 216 hr. American Society for Testing Metals salt spray test, maker reports — Hachette Chemical Products Corp., 470-474 Poughkeepsie Ave., New York, N.Y.

Hydra Spring with built-in valve for dampened action to cushion impact products up to 1,600 lb. force at each stroke. Unit is 4 1/2 in. long, including stroke, a 2 1/2 in. diameter — Hydra Spring Division, White Stag Corp., 385 Payne Ave., N. Yonkers, N.Y.

Type 100 absolute pressure control for pressurizing pumps or other equipment, uses a completely evacuated bellows, providing positive working independent of atmospheric pressure and temperature — United Electric Controls Co., 81 School St., Woburn, Mass.

Spotcheck dye penetrant, an inspection fluid, is now available in prepackaged one for easy application. Complete penetrant, developer and cleaner kit costs \$15 — Magnaflex Corp., 7521 Austin Ave., Chicago 11, Ill.

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Photo courtesy  
Herman Nelson Helicopters, American Helicopter Co., Inc.

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before impact and that all controls and instruments were functioning in a normal manner. The engine, a Pratt and Whitney R3180, had been properly maintained.

At the time of the accident the flying operations of Petroleum Helicopters was varied and extensive in the United States, Panama, and South America. In the Grand Life area it was a transportation service for oil and oil well drilling companies. The operation was restricted to transporting personnel over short distances between Grand Life and several offshore oil drilling locations. The service, a comparatively new method of transportation in the oil industry, was conducted to provide transportation in a regular and emergency basis, involving approximately 41 flights during a 24-hour period.

Investigations disclosed that the company employment standards for helicopter pilots were high and that training and experience were continuously conducted by the chief or assistant chief pilots to insure a safe operation. Company policy gave the pilot authority to discontinue or cancel a flight if conditions, in his opinion, made the flight undesirable. The minimum weather conditions for VFR flights were established at ceiling 300 feet and visibility 4 miles.

Other operating procedures and requirements provided that the rotating cockpit and seat assemblies were equipped with and were life jackets and that the passengers were to communicate with the land-based support parties. The so pilot also prepared required manifests and ascertained that all belts were fastened before the flight. According to testimony these requirements had been met before the subject flight.

Refueling procedures used in the company's operations required that the helicopter be serviced with refueling fuel for the next scheduled round trip flight. In addition to a minimum of 30 into reserve fuel, investigations revealed that the aircraft was in excellent condition for the subject flight, also, the danger to the wreckage indicated that a considerable amount of gasoline and oil leaked following impact.

Several witnesses substantiated the crew's statements that prior to the time of collision they could not detect lights and other off-axis drilling rig lights which varied between 5 and 10 miles away. Stars were clearly visible. Witnesses disclosed that at the helicopter stated that at least four or five low-level red signals were after the flight departed.

Each crew member of the subject flight was well qualified and had received rigorous checks in emergency operating and emergency procedures for helicopters. Both crew were last pilots and during daylight hours flew alone. At night, however, as a safety measure, two pilots were required to operate the R3180 and the pilot under the flight commander's guidance every other flight. Communications equipment installed in the aircraft, at the Grand Life heliport, and at each offshore terminal provided continuous contact between the aircraft and any terminal on one kind radio frequency. Operating procedures gave aircraft transmission priority over any other messages.

At the present time helicopter flight

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characteristics have made instrument flight status in under certain conditions, especially during the approach and landing configurations when slow speeds are necessary. Although great progress has been made, the V-11 helicopter and others have not yet been certified for commercial instrument operations. Therefore, Petroleum Helicopters did not intend that flights to make value continuous visual ground reference could be maintained.

The weather conditions which existed at the time of the accident consisted of a cold front which extended east and went through northern Louisiana and which was moving slowly northward at 0130 on Dec. 2. It was about 10 or 15 miles north of Grand Isle. The front separated a relatively dry polar air mass on one side to the north and a moist tropical stable air mass to the south. Characteristics of the masses, the cold water was colder than the Gulf water and night radiation cooled the land surface rapidly. As a result, the air near the surface was cooled to the dewpoint, whereas the cooling occurred on the Gulf water. These factors, coupled with the stable or moist and light surface wind, produced fog along the land and the inland and coastal waters in the Grand Isle area about the time.

Investigation disclosed that Petroleum Helicopters had an arrangement for obtaining surface forecasts or advisories for their operations, but were then any official weather observations available to them for the southern Grand Isle area. The Illinois Oil Co., however, had a contract with a commercial weather service located in New Orleans for obtaining marine weather observations and forecasts twice daily at 0600 and 1800. These advisories and forecasts were received by telephone and an operator made available to the helicopter company, and were passed to flight operations for the pilots. The commercial weather service also provided special weather information when they considered it necessary.

The ops of N 717A stated that on the day of the accident they had the weather balloons which indicated the possibility of patchy island fog during the evening hours of December 1 and early morning hours of Dec. 2. They also stated that because of the forecast they were especially cautious of the local conditions prior to takeoff.

#### ANALYSIS

The fact which the flight encountered was completely visible in intensity and thickness and was drilled by the local northwest wind flow. It appears that the fog at Grand Isle formed in a light drizzle before the flight left ST-6 and that drizzle fog formed and seemed to very rapidly clear up the flight. The situation and the accident that resulted showed the need for more frequent, more adequate, and detailed weather forecasts and advisories to Petroleum Helicopters operations.

The rapid formation of fog also verified pointed out the need for some observation equipment to be located at Grand Isle so that conditions there could be continuously observed and calculated changes immediately recognized (see footnote p. 110).

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1958-1960 C-47, C-54, C-55, C-56, C-57, C-58, C-59, C-60, C-61, C-62, C-63, C-64, C-65, C-66, C-67, C-68, C-69, C-70, C-71, C-72, C-73, C-74, C-75, C-76, C-77, C-78, C-79, C-80, C-81, C-82, C-83, C-84, C-85, C-86, C-87, C-88, C-89, C-90, C-91, C-92, C-93, C-94, C-95, C-96, C-97, C-98, C-99, C-100, C-101, C-102, C-103, C-104, C-105, C-106, C-107, C-108, C-109, C-110, C-111, C-112, C-113, C-114, C-115, C-116, C-117, C-118, C-119, C-120, C-121, C-122, C-123, C-124, C-125, C-126, C-127, C-128, C-129, C-130, C-131, C-132, C-133, C-134, C-135, C-136, C-137, C-138, C-139, C-140, C-141, C-142, C-143, C-144, C-145, C-146, C-147, C-148, C-149, C-150, C-151, C-152, C-153, C-154, C-155, C-156, C-157, C-158, C-159, C-160, C-161, C-162, C-163, C-164, C-165, C-166, C-167, C-168, C-169, C-170, C-171, C-172, C-173, C-174, C-175, C-176, C-177, C-178, C-179, C-180, C-181, C-182, C-183, C-184, C-185, C-186, C-187, C-188, C-189, C-190, C-191, C-192, C-193, C-194, C-195, C-196, C-197, C-198, C-199, C-200, 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other situation would result in chaos."

USAF's proposal to leave the Civil Aeronautics Administration's authority to civil facilities, Ruckel complained, could "effectively block any real serious cyberneticization of air transportation."

Tipton considered the proposal "wholly unworkable" and one which could completely reverse the policy which both the government and the industry have been endeavoring for years to carry out. "Vigorous efforts and enormous expenditures of time and money have been committed to a common vision program. What the Defense Department now seems to be proposing is that the airplane be abandoned," he said.

Ruckel and Tipton also objected to the USAF proposals:

- Permit USAF contract carriers to fly cargo without regard to their base authority from CAB.
- Authorize USAF to make emergency flights without regard to rules filed with CAB.
- Permit military personnel to repair civil aircraft without regard to Civil Air Regulations.

## Direct Erie-Detroit Route Under Study

Civil Aeronautics Board will investigate the need for direct local service between Erie, Pa., and Detroit.

The Erie-Detroit Service Case is based on an application of the Erie Municipal Airport Authority for service between the two cities. Subsequent, Allegheny Airlines, Mohawk Airlines, Lake Central Airlines and North Central Airlines said that various application forms be considered with the Erie-Detroit case.

CAB has included applications of all five local service carriers but has several parts of the applications which don't apply directly to the route, considering the route strictly to Detroit-Erie service.

## DC-4 Deal Approved For Eastern, Slick

Eastern Air Lines and Slick Airlines have received operating authority from the Civil Aeronautics Board to lease DC-4 aircraft from Aero Leasing, Inc.

Aero Leasing announced five months ago and bought five DC-4s from Eastern.

Eastern is leasing five of these back for a year, and Slick is leasing three for three years.

Aero is empowered under its charter provision to buy, lease, charter or otherwise acquire aircraft, but it cannot build or operate them, nor use the company

aircraft in airline operations. CH 1008 short of stock authorized, 800 have been issued.

Of these 800 shares are held by Standard Pattern Corp., 100 by International Financial Corp., and 25 each by R. R. Holt, J. B. Lewis, Edwin Truckyard and Stanley D. Wynn.

In its order, CAB notes that Holt Truckyard, Lewis and Wynn are involved in both Aero Leasing and the North American Airlines group. The Board specifies that no discussion to use, exceptation to Slick and Eastern shouldn't be continued as approval or authorization of the relationship.

## Lights Test Extension Favored by Board

Continued experiments with lights on instrument aircraft is favored by the Bureau of Safety Regulations of the Civil Aeronautics Board in a proposal to extend its special regulation on the subject.

CAB wants to extend the authority, in special Civil Air Regulations 80.782 to Jan. 30, 1960. The present regulation, which expires at the end of this month, was adopted Apr. 9, 1953 to permit experiments with a limited number of aircraft on position light and anti-collision light systems.

The proposed special regulation, which would replace the present one, would permit air carriers to experiment with lighting systems while operating on scheduled or other service. Approval of the Civil Aeronautics Administration would be necessary, and it would have the responsibility of providing conditions and limitations needed to insure safety and avoid confusion in air navigation.

## Lufthansa Is Given CAB Carrier Permit

Operation of Lufthansa, the new German airline between Germany and the United States has been approved by the Civil Aeronautics Board and President Eisenhower.

CAB has issued a foreign air carrier permit to the carrier which authorizes transportation of persons, property and mail between a point or points in Germany and New York, San Francisco and Canada.

The permit is good for a year or any further period provided for when a bilateral agreement is reached between the United States and the Federal Republic of Germany before that time.

The German carrier is permitted to use any of three registered names in place of its German title Deutsche Lufthansa in Abkürzung (DLH). The company can call itself Lufthansa, Luf-

thansa Lines or Lufthansa German Airlines in United States operations as long as it includes all names under which it operates on its ticket stock and CAB reports, and displays them permanently in the passenger compartments of its aircraft.

## Seattle Homeowners Sue Port of Seattle

Seattle Homeowners near the Seattle/Tacoma International Airport are suing the Port of Seattle and an airline for \$1,289,736. In effect, the 21 plaintiffs charge, their property has been continuously lowered of aircraft noise and low-flying planes.

The homeowners say airplanes fly over their homes at 100 ft. This will be once twice, this week, when the Port of Seattle carries out its plan to extend north-south runways.

Because of these conditions, the suit charges, banks and the Federal Housing Administration will not grant or guarantee loans to buy or build homes in the vicinity.

## SHORTLINES

• **Inland Airlines** negotiated weekly direct service between New York and Louisville, Ky. Flights for the different service are 5251-50 one way and 5507-10 round trip.

• **North Central Airlines** started non-stop service between New York and Detroit with four flights a week.

• **North Central Airlines** carried 25,613 passengers in April, a 45% increase over April 1954. Load factor increased from 45% to 65%.

• **Southern** reported first quarter air freight traffic increased 27% over the first three months of 1954.

• **Tennessee Air Lines** reported a 90% increase in West Coast Hawaii passenger business in first quarter 1955 over the same period of 1954.

• **TWA** World Airlines started nonstop service between New York and San Francisco June 1 with Super G Constellation.

• **VARI** airlines of Brazil plans to inaugurate direct New York-Gladfield Traffic service this summer with Super-G Constellation on its New York-Sao Paulo route.

• **British Overseas Airways Corp.** plans to put the Vickers Viscount transport on its Miami-Nassau route this year.

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4. FOR MORE FACTS about Fenwal Aircraft Gas Turbine Thermocouples see Fenwal's new illustrated booklet, 'Fenwal—Simply a Word in the Aircraft Game' and 'Fenwal—Simply a Word in the Aircraft Game' booklet. Request your copy of this booklet now in Fenwal Inc., Aviation Products Division, 100 Franklin Street, Allentown, Mass.



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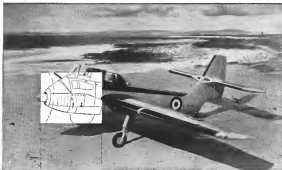








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## Reversal on Russian Airpower Threat

Events in Congress, the Pentagon and the White House during the past two weeks have confirmed in even detail the facts published by *Aviation Week* on May 25 regarding the number and type of new Russian aircraft deployed over Moscow: the significance of this rapid program in Soviet jet airpower to the United States, and the charges made that top level civilian government officials were deliberately concealing the true facts on this Russian air threat from the American people.

Since publication of *Aviation Week's* story, "Russian Jet Airpower Gains Fast on U.S.," and its editorial, "Double Shock for Americans," on May 25, the Eisenhower Administration has completely reversed its position on the scope and significance of the growing threat of Russian airpower to this country. From a complacent attitude of "all's well" and "no changes are necessary" this administration has switched to public admission that the Russian threat is real and that it requires positive action in accelerating production of key U.S. aircraft such as the Boeing B-52 heavy jet bomber.

Here is the detailed chronology of this amazing reversal of position by the Administration:

May 13—Department of Defense releases vague and incomplete statement on Russian air display over Moscow.

May 17—Sen. Stuart Symington calls for a congressional investigation to determine whether Russian airpower is growing on the U.S.

May 18—President Eisenhower advises Sen. Symington's charges stating "It is just not true" that we have lost technical and numerical superiority in the air "in a twinkling."

May 19—USAF Secretary Harold E. Talbott and General Nathan F. Twining, USAF Chief of Staff, reassure House Armed Services Appropriations Subcommittee that the U.S. is superior to Russia in the air. Brig. Gen. Woodbury Burgess, director of intelligence for Air Defense Command, is rebuffed by Gen. Twining for stating publicly in Detroit that "the Russians have planes that are as good if not better than the U.S."

May 25—*Aviation Week* publishes full details of Russian air display and charges top level civilian officials have concealed these facts from American people in an editorial. *Aviation Week's* story and editorial widely quoted in daily newspapers, radio and television. Senate Symington takes Senate floor to demand that Adminis-

tration either confirm or correct *Aviation Week's* statements.

May 24—Defense Secretary Charles E. Wilson confirms *Aviation Week's* details on numbers and types of Russian aircraft shown over Moscow in an official Defense Department statement. Secretary Wilson tells his press conference there are no plans to change the aircraft production program.

May 25—Secretary Talbott and Twining testify in executive session before the Military Appropriations Subcommittee of the Joint Congressional Committee on Atomic Energy. Twining reverses earlier statements and admits Russian airpower threat is grave and U.S. action required. Senator Henry Jackson, subcommittee chairman, says proof that Russian threat is grave will come when USAF announces it must accelerate production of B-52 heavy jet bomber and other aircraft types.

May 26—Secretary Talbott and General Twining testify in executive session before the Senate Armed Services Committee. Immediately afterwards, USAF announces a 35% acceleration of Boeing B-52 heavy jet bomber production.

May 31—President Eisenhower confirms that USAF has been authorized to accelerate B-52 production.

These events have indicated clearly that the top level civilian officials of the government concerned with national defense were wrong in their original attempt to conceal the true size and significance of the Russian air display from the American people and were wrong in their evaluation of the recent size of Soviet announced program as relation to the pace of U.S. development.

Thanks to the tenacity and enterprise of a free press and the persistence of law legislation in the Senate the record on this score has now been set straight.

But the acceleration of the B-52 production program is only the first step in a positive, concrete program necessary to provide and maintain a significant U.S. lead in the air over our Russian competition.

The entire aeronautical research, development and production program of both USAF and the Navy must be reviewed, re-evaluated and revitalized to surpass the rapidly increasing pace of Russian airpower and to maintain the air superiority without which this nation will perish.

—Robert Hertz



## RADAR GUNSIGHT HELPS TAC PILOTS BAG "FOE"

Korean tested Device Proves Deadly Accurate in Stopping Jet "Intruders"

### THE STORY BEHIND THE STORY

Here at home, where jet defenses are constantly being strengthened, there's a good chance of detecting and intercepting hostile planes before they reach this coastline. And abroad, as you've probably noticed from headlines like the one above, chances are good that aggressors would be intercepted and shot down by fighters from our overseas bases or from just wings.

One reason for the impressive marks made by the Sperry gunsight is its accuracy in training. Another is the accuracy of the computing gunsight itself used in Korea and now serving TAC and NATO squadrons. Here's what's new, in the words of General "Jimmy" Doolittle:

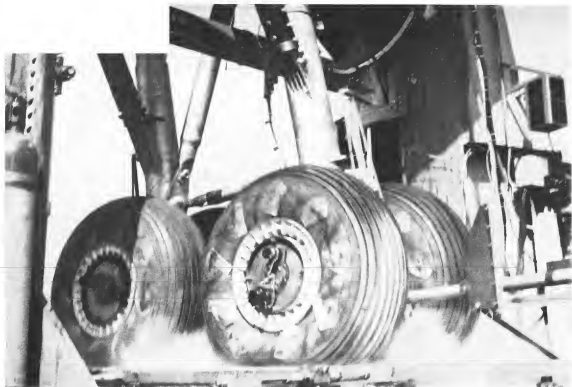
"In jet combat you are closing a small and chaotic group, and you have only seconds to shoot at it. You are handling ten miles per second, twenty and thirty, your target close because the speed

and range of the target or the angles involved in turning it—and even if they could, you lack time for necessary calculations. The new gunsight does this for the pilot. He watches an illuminated circle and dot reflect on his windshield. When circle and dot are superimposed on the target, he fires.

Developed through the joint efforts of the Air Materiel Command and the U.S. Air Force, under Director Dr. C. Stark Draper, Sperry, and the U.S. Army's Armament Laboratory—the radar gunsight is an example of teamwork at its best—providing better weapons for defense efficiency and security.

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these punishing tests is the new Lockheed Super G Constellation, already placed in service by TWA. The Super G Connie's landing gear is only one of the many structural sections of the new plane fastened with vibration-proof Elastic Stop nuts.

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